The Electrical Industry's Weekly Magazine

October 22, 1956

Electrical World

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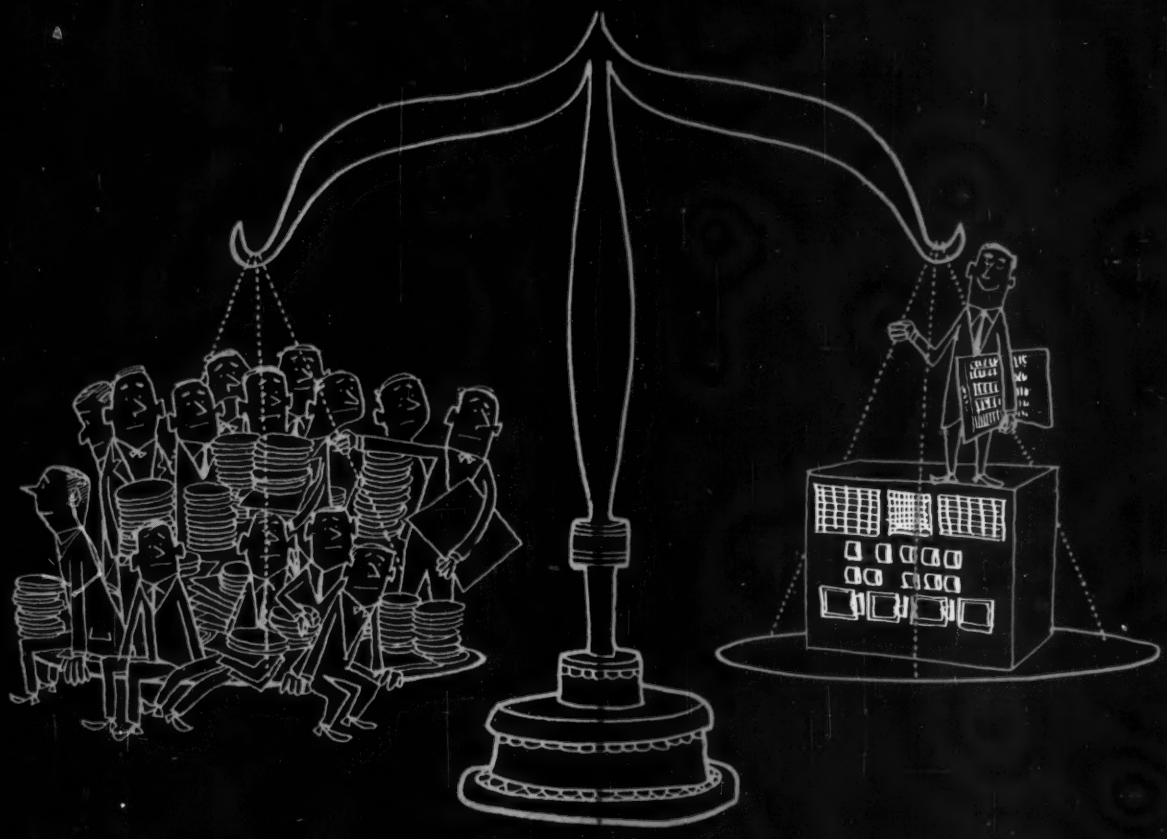
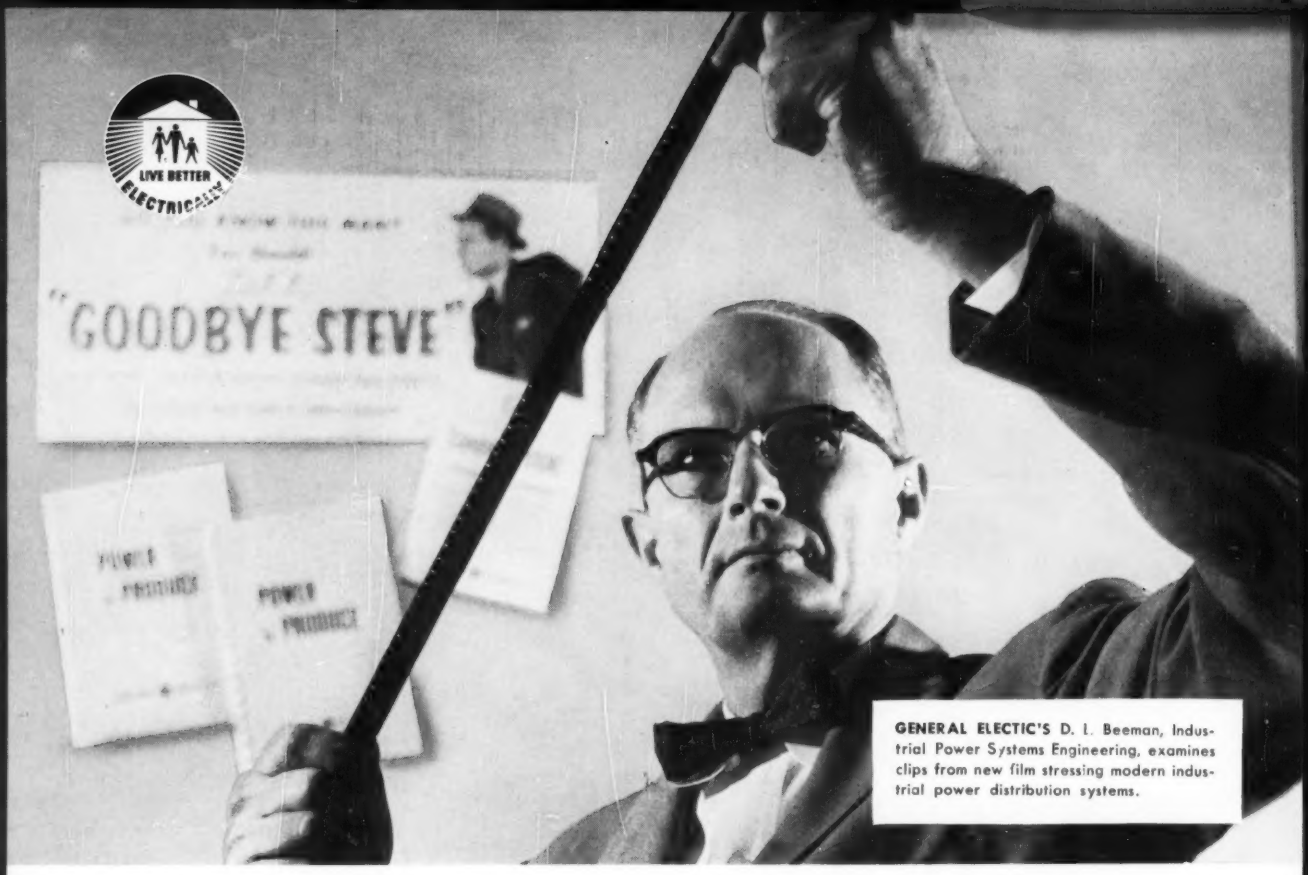


'AUTOMATIC' STEAM PLANT SLASHES OPERATING COSTS

PAGE 48

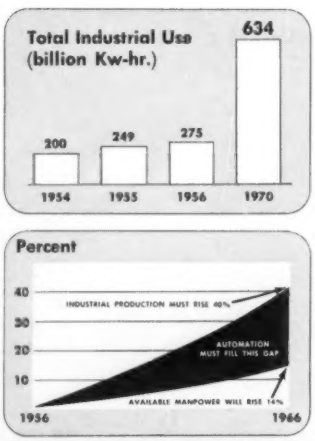
A-Plant will compete before 1980
...page 31

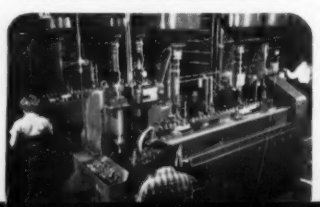


GENERAL ELECTIC'S D. L. Beeman, Industrial Power Systems Engineering, examines clips from new film stressing modern industrial power distribution systems.

New Industrial Power Distribution Program helps pave way for automation by spurring plant expansion and modernization to . . .

Remove bottlenecks to realization of industrial load growth forecasts





FORECASTS SHOW industry's use of power climbing to 634 billion kw-hr by 1970*. Automation will eventually fill the void left by an insufficient labor force. Automated processes (bottom) like this, used for condenser parts assembly, typify future production lines. *Source: McGraw-Hill Publishing Co.

General Electric's Industrial Power Distribution Program is designed to focus attention on industrial plant power distribution systems, too often neglected by industry. By so doing, it will help pave the way towards meeting load growth forecasts, and will accelerate the trend to automation.

Economists predict that by 1966, the demand for goods and service will increase over 40%, while the available work force will increase only 14%. Obviously the gap will have to be filled by automated processes.

In order to make automation workable, the user must prepare for greater load and closer regulation through a more efficient power distribution system. To help effect this, General Electric has recently launched a comprehensive "More Power to America" program stressing reliability, economy, safety, flexibility and expandability in the plant's distribution system.

A color motion picture, "Goodbye Steve," the manual "Power to Produce," advertisements, Productivity Forums and a host of other aids will explain to industry the need for streamlining its power distribution systems. Motion pictures and manuals to help pave the way to automation for your industrial customers may be obtained through your General Electric Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y. 301-322

MORE POWER TO AMERICA

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Electrical World

Published for 82 years for those engaged in the business of generating, transmitting, distributing, or supplying electric power

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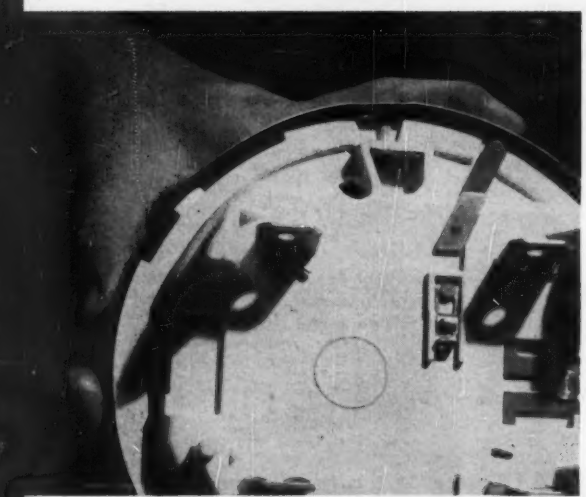
• • •

COMING NEXT WEEK—A 12-page "cost cutting" report will be packed with money saving ideas for engineers and operating men.

THE NEW SANGAMO OK SEAL is simple in design. It consists of two parts, made of almost pure aluminum and treated to resist corrosion.

SEALS ARE SIMPLE TO INSTALL. Sangamo meter sealing tools are available for you. But these seals can easily be closed with a screwdriver.

Ready for Shipment... and ready for use- SANGAMO J2 METERS



When a Sangamo J2 Meter leaves the factory, it has been so accurately calibrated on the Sangamo Comparator that it is shipped *sealed*—ready for use. No adjustments are necessary. The Sangamo OK Seal assures accurate calibration.

This easily removed, non-reusable seal provides an economical means of sealing meters. It eliminates the time-consuming, costly threading of lead button seals both in the factory and in your shop.

If Sangamo meters are opened, they can be easily and inexpensively resealed with the Sangamo time saving seal or with a conventional lead button seal. Sangamo OK Seals are competitively priced—available for your use. Write for further information and prices today.

NO MORE COSTLY THREADING OF LEAD SEALS. You can seal meters faster, cheaper with the Sangamo OK Seal. Your shop tested meters stay sealed—as calibrated.

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

JM56-4

A Tribute to 35 Men

Our electrical industry today owes much to its system of standards. But it owes more to the dedicated men who formulated them. Too often the effort they spend and their own identity are submerged and forgotten in the impersonal nature of the standard they produced.

Last month, in Washington, D. C., one such group of men paused briefly to mark a milestone in their activities. Characteristically they did it quietly, among themselves, and without fanfare. We believe that the industry too should recognize that milestone and the very real contribution that this particular group has made to its progress.

We refer to the Joint Committee on Standards for Distribution Transformers, established a little over 18 years ago by the Edison Electric Institute and the National Electrical Manufacturers Association. On Sept. 20 and 21 the committee met for the 50th time in the place of their inaugural session under the honorary chairmanship of A. E. Silver, who with the late J. J. Mullen, jointly guided the activities of the charter group.

This committee is not a large one. There have been only 35 members in its entire history. But by any measure their achievements have been great. Mark them:

1. They developed a totally new distribution transformer mounting which today has complete industry acceptance.

2. They have provided almost complete interchangeability among transformers by promoting uniform dimensions of components.

3. They have reduced unit costs by eliminating non-essential parts and accessories.

4. They have built a national respect for standard voltage ratings by providing a transformer standard based entirely on nationally accepted standards for system voltages.

5. They perfected a standard that, through interchangeability and repetitive manufacture, has secured faster delivery of transformers and fostered regional stocking of standardized units.

6. They have provided a forum where transformer users can voice needs for changes in the standard.

Added up in money it has been estimated that the standardization activities of these 35 men have cut the utilities' annual bill for distribution transformers by about one-third. We estimate that instead of spending upwards of $200 million last year, users would have spent at least $300 million without standards.

To men like these the industry owes its progress and its thanks.

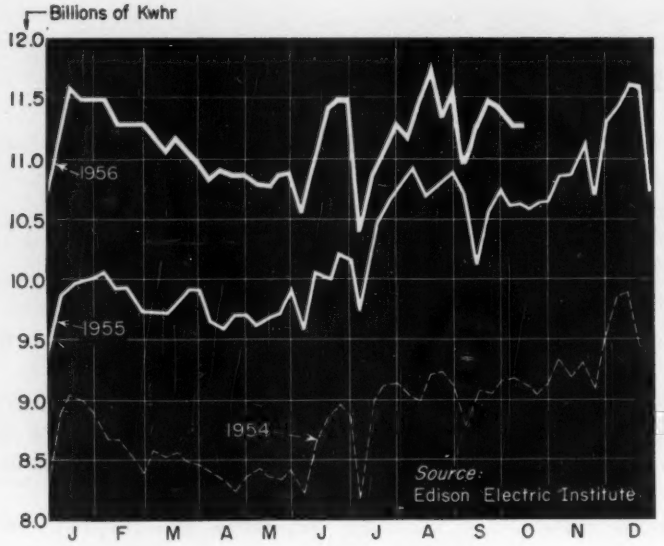
Joint Committee on Standards for Distribution Transformers

1938–1956

Edison Electric Institute		National Electrical Manufacturers Association	
E. V. Sayles*	M. W. Ghen	M. F. Mitschrich	B. S. Morris
A. E. Silver*	M. DeMerit*	J. B. Hodtum	E. K. Kane
H. A. Enos*	W. R. Doar	H. B. Keath	A. M. Salazar
T. J. Brosnan	R. J. Bentzel	H. M. Jalonack	H. W. Dornbush
C. K. Poarch	H. L. Deloney	R. D. Rung	H. K. Hodnette
F. E. Sanford	W. F. Nimmo	A. C. Farmer*	J. L. Cantwell
A. B. Campbell	G. A. Brokaw	W. A. Sumner	H. F. McRell*
D. M. MacGregor	H. E. Kent	M. L. Bright	J. J. Mullen*
H. E. Jung		A. E. Herzberg*	A. L. Horelick

* Charter Members

ELECTRICAL WEEK



OUTPUT

Week ended Oct. 13, 11,300,000,000 Kwhr Up 6.6%

Atomic Energy Commission requirements—1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 6.3%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Oct. 13	+6.6	+5.8	+3.6	+5.9	+8.8	+5.1	+15.2	+10.3	+9.6	+5.7
Oct. 6	+6.6	+5.5	+4.4	+5.8	+7.2	+6.2	+9.3	+11.4	+7.6	+9.2
Sept. 29	+6.9	+7.9	+5.5	+7.7	+8.1	+5.5	+6.9	+9.4	+5.2	+8.8

Seasonally Adjusted Index 217.9 Week Ago 218.0 Year Ago 204.2

Here are the issue's highlights . . . Cause of stator failure that delayed turnover of TVA's Gallatin No. 1 unit is discovered . . . Con Ed customers hit by substation failure . . . Japan urges stepped-up atomic program in U. S. . . . Clyde Ellis blasts utility ad expenses . . . Upper Colorado Project started by President Eisenhower from White House . . . Georgia Power plans to buy Georgia P&L from Florida Power for $16.5 million . . . Passamaquoddy tidal power project may be revived . . . ASTM hears how specific gravity tests could save in pole costs . . . Utility progress reported at SEE conference . . . Nuclear power plants will be competitive before 1980, says O. B. Falls of GE.

New York's Gov Averell Harriman okays State Power Authority's request for $350,000 loan to finance "urgently needed" preliminary work on Niagara power project. Authority Chairman Robert Moses confident of FPC license to develop controversial project, despite predicted court test on U. S.-Canada treaty.

Interior Department announces allocation of 7,250 kw to Roseville, Calif., from Central Valley project. Interior's previous refusal to supply the original 10,000-kw sought by Roseville, subject of recent Congressional committee hearings, was reversed after a request to existing preference customers to re-assess their needs up to 1960.

Congratulations—New members of six-man Inter-industry Farm Electric Utilization Council are Iowa P&L Pres N. Bernard Gussett and A. F. Crowell, manager of First Electric Cooperative, Jacksonville, Ark.

Public Service of Colorado and three IBEW locals sign one-year contract for 7% general wage hike to operating, maintenance, and construction employees, retroactive to June 1. Comparable salary adjustments also were put into effect by PS for about 1,450 clerical and professional employees.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire—AEC contracts with Atomic Industrial Forum to conduct survey of the needs for scientific and engineering manpower in private atomic energy industries . . . **Public hearings,** as in Power Reactor Development Co case, may be instituted by AEC as permanent procedure on all future nuclear power reactor construction permits.

If a growing volume of power is to be sold, the price has to be right, REA Administrator David A. Hamil told Third Annual National Power Use Workshop. Disagreeing with the view that co-ops and power firms must be at war with one another forever, he declared, "Co-ops and companies have many reasons for going down the line together."

Explosion in combustion chamber of an oil fired boiler took Dairyland Power Cooperative (LaCrosse, Wis.) 22,000-kw generator off line. Unit is expected to be back in operation within 10 days.

Washington State Supreme Court refuses to act on petition by state fish and game department that Tacoma be found in contempt of court for dumping rock into Cowlitz River at site of FPC-licensed Mayfield dam. Action now returns to Thurston County Superior Court, which previously found city was violating state law in building the dam but allowed construction to proceed providing nothing be done to interfere with the river or injure fishlife.

Curtailment of Los Angeles Dept of Water & Power's planned 5-year, $261-million electrical construction program may be necessary if voters fail to okay proposition to allow increase in amount of revenue bonds the agency can issue.

Brownsville (Tex.) residents vote down issue of bonds for new power plant 1,539 to 1,206. City may consider sale of its properties to Central P&L.

First Boston-Glore, Forgan group is offering 400,000 shares of 4.64% cum preferred stock of Commonwealth Edison at $100 a share . . . Merrill Lynch, Pierce, Fenner & Beane and R. S. Dickson & Co is offering 500,000 common shares of Carolina P&L at $24.375 a share (see p 63).

ABOUT PEOPLE IN THE INDUSTRY

Prediction of an all-out effort to "put over a new 'Gore Bill' that would plunge the government deep into the business of generating electric power from the atom" was made by Middle South Utilities Pres **E. H. Dixon** at Rocky Mountain Electrical League meet. He said many who favor such legislation "are motivated principally by a burning desire to use the atom as a means for furthering the federal electric power program."

TVA is tackling its last big building program on its own—a $184-million, seven-unit project—and will have sufficient funds to build only 35 to 45% of the power facilities it will need after 1960, said TVA Power Manager **G. O. Wessenauer.** He claims TVA cannot continue to build new units as needed and at the same time repay the U.S. Treasury, as required by law, the money appropriated to TVA for power facilities.

More News About People page 36

Stator Failure Mystery Solved

Double grounded circuit in resistance-temperature detector is determined as cause of damage of two stator coils during test run at TVA's Gallatin steam plant

Cause of the "electrical disturbance" in early August that delayed energization of Tennessee Valley Authority's 250,000-kw Gallatin No. 1 generator has been laid to a double grounded circuit in a resistance-temperature detector.

The failure of two stator coils, termed a "first-of-its kind" by a Westinghouse Electric Co spokesman, occurred during a no-load test run when an overheated coil in the generator burned a 4x6-in. hole in the ⅜-in. steel coverplate (EW, Aug. 20, p 101; Sept. 10, p 18).

After the failure had been reproduced in the Westinghouse East Pittsburgh Works, the double ground was explained as follows by J. W. Batchelor, manager of Turbine Generator Engineering Department, T&G Division:

"Prior to the test run at the factory, the generator was given over-potential tests. No coil failed during either preliminary or final dielectric tests. When the resistance temperature detectors were tested, one of these detectors in slot No. 4 was found to be grounded. The leads to this detector were cut off as there are sufficient detectors in the stator to indicate temperature. The machine was then put on test and records show all operations were normal.

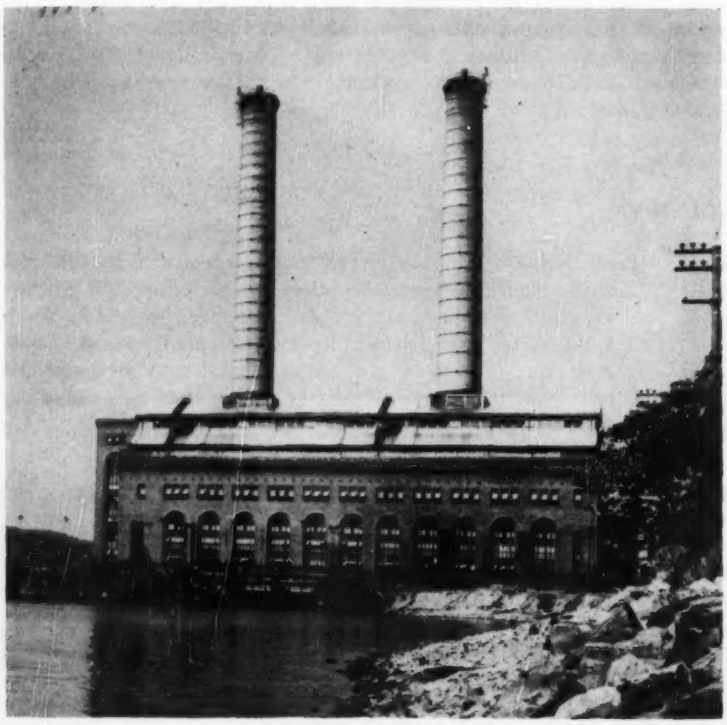
"During erection at Gallatin," he continued, "the cut-off leads of the resistance-temperature detector in slot No. 4 were spliced and reconnected to the terminal board in error. This produced a double ground from the temperature detector to the stator frame.

"On start-up for the no-load test run," said Batchelor, "current flowed through this double-grounded circuit and burned the resistance-temperature detector to a crisp. As the detector lies between the two coils in the slot, the insulation on the bottom side of the top coil and on the top side of the bottom coil was badly burned. A short circuit between the two coils resulted, with a portion of the top coil being forced into the gap."

Batchelor said the lab reproduction of the failure, made necessary because there was no experience to draw on to determine the cause, produced the burning and a short circuit identical to that produced in the generator at the time of failure. He added that measures will be taken to prevent any similar failures in the future.

Sub Fails; 75,000 in Dark . . .

. . . but Con Ed's old Glenwood Station aids 'lights on' action



A power failure at Consolidated Edison Co of New York, Inc's Dunwoodie substation Oct. 10 plunged about 75,000 Yonkers and other Westchester County customers into darkness from 18 minutes to nine hours.

The blackout occurred at 7:01 PM when a tap charger failed on a 30,000-kva transformer bank. Differential relays took out another 30,000-kva bank on same high-tension bus.

This shifted the full substation load to a third 30,000-kva bank because a fourth bank was being moved to a new site in an enlargement program under way at the substation.

The single bank was unable to carry the 64-Mw load and tripped out on overload. The 13-kv breaker failed in opening.

Dunwoodie fed to other stations having a 33,000-kva total capacity. The complete power failure at Dunwoodie also de-energized these two substations.

Restoration of service included starting up the old Glenwood steam station (35,000 kw) which was on cold standby, and switching power into the area from nearby substations.

The damaged equipment has been moved to Con Edison's shops for complete overhaul, which will require "four weeks to four months."

Japan Prods U. S. Atomic Progress

30 industrialists on worldwide shopping tour express disappointment in market here, may buy unit in Britain. Concentrate on experimental power units U. S. advises

U. S. effort in its atomic power program is "still not big enough," according to representatives of one potential customer of U. S. nuclear products and know-how.

Members of Japan's Atomic Industrial Mission declared they hoped this observation would bring "pressure" in expediting the U. S. program. The 30 Japanese industrialists, engineers, and government scientists recently completed a tour of American companies and nuclear installations. They gave their views on America's atomic status before leaving for Canada, France, and England.

The group embarked from Japan with the idea of deciding upon two or three types of 10,000 to 20,000-kw experimental power reactors, said Atsushi Ohya, vice-chairman of Japan's affiliate of the Atomic Industrial Forum. In the U. S. this would hinge on a successful bi-lateral agreement to exchange data and reactors for all uses. The reactors would supply experience, Ohya said, for Japan's "keen need" to produce 450 Mw from atomic sources by 1965 and 2,800 Mw by 1970 to keep ahead of demand.

Might Invest Now

If proposals for full-scale reactors prove competitive with conventional fuels, Ohya stated, Japan will invest immediately in a large plant. It would be premature, though, based on U. S. stage of development, he added.

Britain has offered to sell a Calder Hall type station of 100-Mw capacity for $40 million, a proposal which "we are in a position to consider—seriously," he said. U. S. businessmen advised the group to concentrate on experimental reactors, he added.

Ohya emphasized that the mission's decision would not be final. It merely will make recommendations to the Japanese government. The objective of the Japanese Joint Committee on Atomic Energy for the next five years is to stick with experimental power reactors until full-scale plants are economically competitive, he said.

Stumbling blocks that now stand between U. S. and Japan include:

- Lack of broad bi-lateral exchange agreements.
- Classified information policy that "seems absurd" to the Mission.
- Uncertainty on price of uranium.

Meanwhile, observers of the U. S. political scene point out that this is the sort of thing that is pressing Congress to establish some type of a bold federal nuclear power development program. The Gore Bill, killed in the last session of Congress, was aimed at jacking up America's atomic power status, which some persons say is needed.

The ghost of the Gore Bill, however, seems to be haunting political circles and may materialize in the next session of Congress.

Item: Rep Melvin Price (D-Ill.) said "our national interest and international prestige require that we accelerate our reactor development program." He said he plans to introduce a bill early next year providing for an accelerated government program and for governmental indemnity against private reactor hazards—a "package" program. He emphasized that his proposals would not be "public power measures."

Item: Sen Clinton P. Anderson (D-N.M.) said the U. S. could sell a number of reactors to foreign countries "who need them now, and need them badly." He cited this as an important reason why the government should launch a reactor construction program supplementary to private industry's.

Low-Water Insurance Bought

. . . by Puget Sound Power & Light in unique plan which would compensate utility for increased costs of steam power use

Fearful that possible low-water conditions this fall and winter may reduce its supply of hydroelectric power, Pudget Sound Power & Light Co has purchased a unique insurance policy to pay for most of the extra cost of steam power.

The policy, effective from late September to May 1, is based on the flow of the Columbia, Baker, Snoqualmie, and White Rivers, on which Puget Power has generating plants.

Terms of the policy state that if the composite flow of the rivers should drop below a certain median point, Puget Power would pay the first $100,000 of added steam costs, the insurance firm the next $800,000. Only once have records shown the flow of these rivers below a point where the difference in cost between hydro and steam power would have been greater than $900,000, at current prices.

The policy was placed through D. K. MacDonald of Seattle. The premium has not been announced.

A similar policy, covering the flow of the Columbia River and its tributaries, reportedly has been purchased from Lloyds of London by Washington Water Power Co, Pacific Power & Light Co, and Portland General Electric Co. The insurance plan is reported as an alternative to the unpopular surcharge adopted by the utilities several years ago when they had to turn to steam power during a low-water year.

Indirectly responsible for the insurance purchase is the Westinghouse Electric Co strike, which put generator installations at Chief Joseph Dam behind schedule, thus reducing the amount of hydro power available. If a power shortage develops, public agencies have first call on the output of federal plants, which means that private utilities must turn to steam power.

In the Pacific Northwest, steam power costs at least twice as much as hydro power sold by Bonneville Power Administration. In a low-water year, this can increase costs of private utilities by several million dollars.

Ellis Hits Utility Ad Expenses

NRECA's general manager says "helpless ratepayer" shouldn't be saddled with costs of "advertising propaganda" and lobbying; wants laws to protect him

Ellis: There Ought to Be a Law

Gen Manager Clyde T. Ellis of the National Rural Electric Cooperative Association has urged again that Congress legislate against advertising and public relations expenses of private utilities.

Ellis' plea was made before the Senate committee on lobbying. Ostensibly subpoenaed to testify about the activities of his group, Ellis devoted most of his prepared statement to an attack on private utilities.

It is wrong "for giant monopolies" to saddle "millions of dollars annually in cost-plus advertising propaganda and direct and indirect lobbying costs onto absolutely helpless ratepayers," said Ellis. Earlier he had disclosed that NRECA's gross income from farmers in 1955 was $563,889 of which $353,836 was from dues.

Ellis' statements did not go unchallenged by the committee.

Sen John L. McClellan (D-Ark.), chairman, wanted to know if a segment of American business is being threatened by federal encroachment. "Can we then say they should be prohibited from trying to advertise and turn the tide of public opinion so they might survive?"

Ellis said he merely wanted to assure that the expense was not charged to the ratepayer.

Sen Barry Goldwater (R-Ariz.), seeking to find out from Ellis "how much socialism is good for America," asked if the utility industry didn't have a right to be concerned about the growth of federal power. Ellis said 'no' because the country is running out of hydro sites. He also contended that no one was advocating that the federal government go into the distribution business or that the private companies be driven out of business.

Ike Push-Buttons Big Project's Start

From his desk in the White House last week, President Eisenhower set off blasts that signaled the start of construction on the mammoth Upper Colorado Project. This $760-million, 1-million-odd-kw project, the Administration's largest power and reclamation project to date, also helps make this one of the biggest construction years in the Bureau of Reclamation's history.

The blasts triggered by the button on the President's desk launched work on the diversion tunnel for Glen Canyon Dam and stripped off rock hindering further drilling and exploratory work on the Flaming Gorge damsite.

Including upper Colorado, the Bureau has started, or hopes to start on these projects before next June 30:

- Glen Canyon Dam (Upper Colorado Project), 900,000 kw capacity.
- Flaming Gorge Dam (Upper Colorado Project), 72,000 kw capacity.
- Trinity Dam, California (Central Valley Project), 233,000 kw capacity.

- Fremont Canyon powerplant and pressure tunnel (Oregon Trail Project), 48,000 kw capacity.
- Two transmission lines for Missouri River Basin project: Fargo-Granite Falls 160-mi, 230-kv line in Minnesota and North Dakota; Utica Junction-Sioux Falls 65-mi, 230-kv line in South Dakota.
- Green Springs powerplant and Keene Creek Dam (Rogue River Project, Ore.), 16,000 kw capacity.

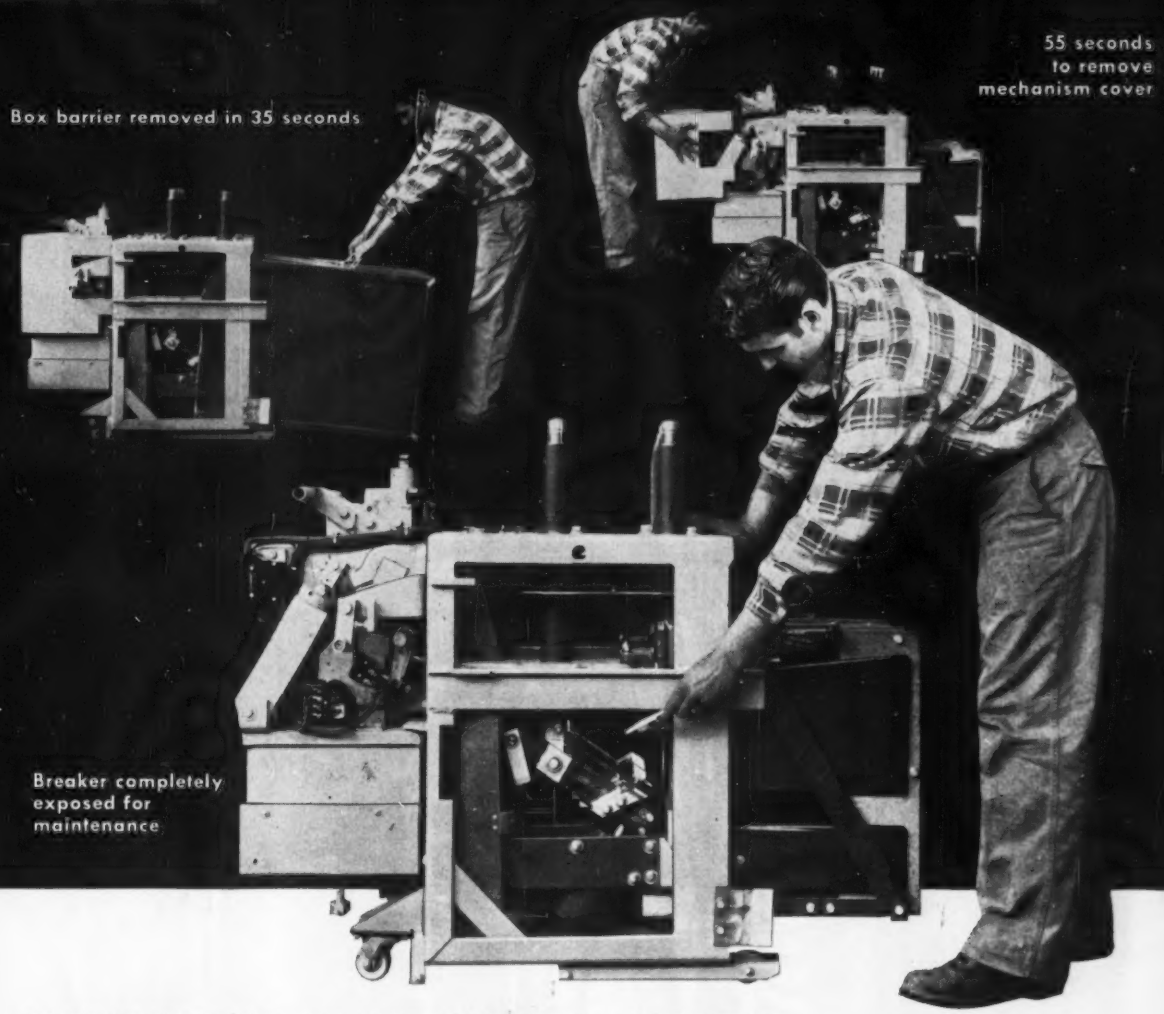
Georgia P&L Sale

. . . plans set: Georgia Power to buy P&L for $16.5 million

Plans for the purchase of the properties of Georgia Power & Light Co by Georgia Power Co were announced last week in a joint statement by Harllee Branch, Jr, president of Georgia Power, and John W. Lastinger, president of Georgia P&L. They said the purchase from Florida Power Corp is subject to the approval of the Georgia Public Service Commission and other regulatory agencies.

The proposed acquisition is also conditioned on the granting to Georgia Power of satisfactory franchises by municipalities in the southern part of Georgia. It was intimated that the purchase price will be $16.5 million.

Branch said that he hoped the transaction could be completed early in 1957 and that the Georgia P&L operation which serves 19 counties in southern Georgia would become the Valdosta Division of Georgia Power at that time.



EASY ACCESSIBILITY OF GENERAL ELECTRIC METAL-CLAD . . .

Cuts Breaker Maintenance to 20 minutes!

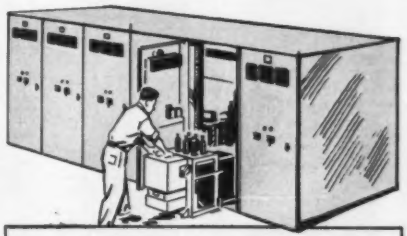
The General Electric Magne-blast circuit breaker is disconnected, removed from the enclosure, and the working parts exposed and inspected. Then, normal cleaning, adjusting, and lubrication is performed and the unit rolled back into service. The entire operation is completed in less than 20 minutes! Equipment handling is safer and easier due to the breaker's low center of gravity.

Easy accessibility is the key to this reduction in breaker maintenance time. It takes only a minute and a half to remove the box barrier and the operating mechanism protective cover, and the Magne-blast circuit breaker is completely exposed for normal maintenance. It is also a simple matter to remove the arc chutes—*but this is necessary only after years of service when inspection reveals that contact replacement is required.*

"A Guide to Switchgear Maintenance" will help you minimize servicing time. For your copy of this new bulletin see your G-E Sales Engineer, or write for bulletin GER-1282 to Section 511-17, General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

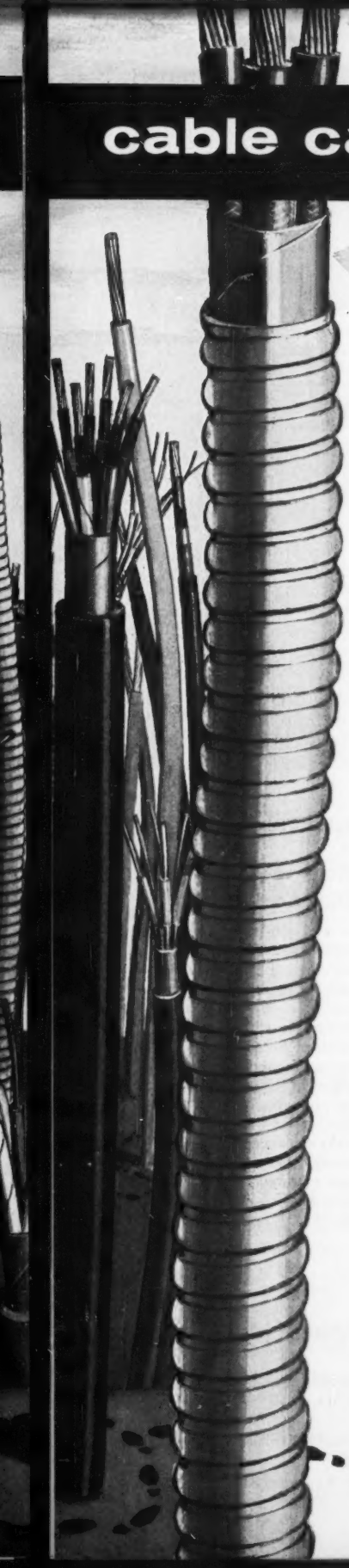


General Electric . . . The Most Modern Metal-clad Switchgear You Can Buy

- NEW SELF-X INSULATION
- BETTER MOTOR PROTECTION
- EASIER, SAFER HANDLING
- HIGHER RATINGS
- 5-CYCLE CLEARING TIME
- EASIER MAINTENANCE
- EXTRA STRONG FRAME

Why selecting the right

cable can be a big problem



You have a plant to wire. You know all the wiring requirements that have to be met. You have catalogs showing an endless variety of power and control cables to choose from. Sure you can pick a *good* one. But how do you unerringly select the *best* for your job? Mostly, it's experience that turns up the *best* from a selection of *good* possibilities. Your own experience is important, of course. And . . . in making the best selection, it's important to remember . . .

How General Electric Can Help You

General Electric has helped many engineers in leading electric utilities and industrial plants solve their wire and cable problems. This experience is at your disposal.

What's more General Electric wire and cable engineers have solved innumerable problems of the same kind which have developed in General Electric's own facilities. And, of course, General Electric knows the requirements of the connected equipment—transformers, load centers, motors, controls, etc. That's experience, too.

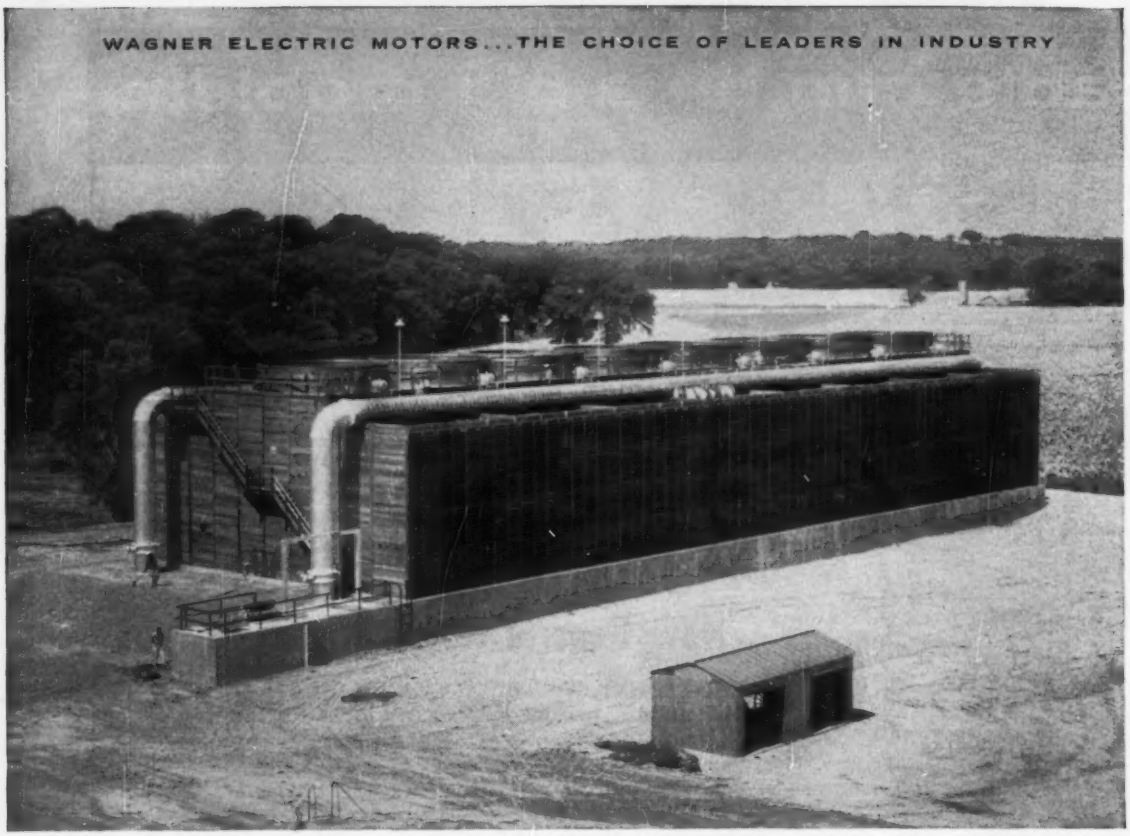
And, since the G-E line of cables covers almost every possible type and construction, these engineers can pick the one cable that will do a given job most efficiently, most economically.

Next time you have a wire and cable problem, why not call on General Electric engineers to help you? Their experience and the tested quality of G-E cables can become an important factor in the efficient operation of your plant.

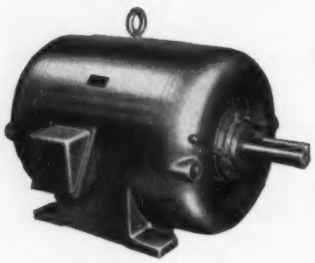
Write for free information on the specific wire and cable problems that interest you. Address Section W179-1027 Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Giant Water Cooler—powered by Wagner Motors



Wagner Type EP—Totally-enclosed fan-cooled motor. Corrosion-resistant frame. 40 to 250 hp.

Marley Cooling Tower cools 44,000 gallons of water per minute for The Kansas Power and Light Company

This eight cell cooling tower for a power company steam plant supplies a constant flow of cooling water to lower steam pressure beyond the turbine to get more kilowatts per pound of steam.

Each of the eight 240 inch fans in this tower is driven by a 50 hp Wagner totally-enclosed fan-cooled motor.

Wagner type EP Motors are well suited to rugged, hard driving, outdoor applications like this. Their totally-enclosed, corrosion-resistant cast iron frame construction protects them from the elements. They have the winding strength required to stand the shock of starting heavy loads repeatedly and the mechanical and electrical stamina to keep operating, without attention, day after day.

This exacting application is one of many where specialized requirements are met from the complete line of Wagner standard motors.

Whatever your requirements may be, there is a Wagner Motor to fit every need—a complete line for all current specifications, with a wide variety of enclosure types and mountings. Your nearby Wagner engineer can help you select the *right* motors for your needs. Call the nearest of our 32 branch offices, or write for Bulletins MU-132 and MU-203.

WH56-8

...to help America LIVE BETTER—*Electrically*

Wagner Electric Corporation
6456 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Electric Railroads to Grow

Electrification is the greatest opportunity now awaiting railroad adoption in the opinion of John W. Barriger, president of Pittsburgh & Lake Erie Railroad. In a Chicago speech, he said electrification would speed rail service and enable rails to haul larger loads. Coal would return as the basic fuel, enabling the United States to conserve its petroleum resources.

Barriger said electrification may be coming in the 1960 decade because insuperable handicaps imposed in the past on rail electrification have now been overcome technologically.

More Heat for Less Money

Despite wage hikes in the coal industry, the price of bituminous coal at the mine of one large source has tended to decrease these last eight years, said T. E. Johnson, secretary-treasurer, Northern West Virginia Coal Association. "The average price of all steam grade sizes of what is known as Fairmont Coal in northern West Virginia mines of this producer was $4.65 per ton as of July 1948. This average was but $4.42 per ton in April and succeeding months of this year."

He added that "even this reduction of 4.9% in the average ton-price of coal does not reflect the total accomplishment, since there has been an improvement in the heat content of the fuel. On the basis of heat content, the price of a million Btu's in 1948 was 17.9¢ as compared with 16.2¢ during recent months." This yields an overall decrease of 9.5% since 1948. Johnson said increased mechanized coal cleaning and preparation helped cut costs.

Bituminous coal prices must go up in view of recent wage increases, but even a 10% price increase will not bring the level, on a Btu basis, above the average Btu price of Fairmont steam coal of eight years ago, he said.

No Coddled Apples

Kentucky Republican Senatorial Candidate Thruston B. Morton said in a recent address to a men's club that Dixon-Yates was a "bad deal." He went on to say:

"There have been several things this Administration has done that have been bad. No one is perfect. But when the sour apples turned up we got rid of them instead of making coddled apples out of them."

A Legal Checkmate

A legal dispute centering about the Municipal Light & Power Dept. of Waterville, Ohio, (pop. 1,110) has wound up in Ohio's Supreme Court. Douglas Graf, a taxpayer, has asked the court to order Mayor Harold Hutchinson to sign $195,000 worth of bonds so they can be sold to raise funds for making electric system improvements. But counsel for the mayor said the mandamus action is improper. Another taxpayer already has filed an injunction suit to stop the mayor from signing, counsel said.

Celebration in the Valley

Governors of Tennessee Valley states have proclaimed Oct. 21-27 a week of celebration of what Valley residents have done on "their own" as a result of Tennessee Valley Authority.

This includes these "proud and happy" facts, as listed by C. L. Beard, president of Citizens for TVA: (1) Local development of the Valley's resource and recreational potentials; (2) Turning a wasting land into "always green productivity;" and (3) "Rehabilitating the No. 1 economic problem of the nation into a bustling, prosperous land of opportunity . . ."

Unity Applied For

Seventeen Public Utility Districts in Washington have applied for authority to create a new state agency to be known as Washington Public Power Supply System, and to build five power plants having a total capacity of 243,000 kw.

A similar move previously failed (EW, Aug. 20 p 97), but now may succeed under a new state law provision which shifts the power of approval from the state Public Service Commission to the state Director of Conservation and Development.

Protesting the PUD union, R. L. Keeting of Dungeness, Wash., requested an injunction, contending there is no provision for public hearings at which taxpayers can protest such proposed ventures. But the provision in the Washington State Power Act held as Judge Max Church of Clallam County Superior Court denied the injunction.

Red Lights Stop Overtime

Dayton Power & Light Co has received 348 calls from customers reporting red lights burning on the utility's protected transformers. All this, including 39 transformer replacements, has occurred since the company started its educational ad campaign instructing residents to report burning transformer warning lights.

Dayton P&L officials are pleased not only because of the ad response but also: Because these calls enable the company to make transformer replacements on a planned basis, because interruptions of service to customers is minimized, and because overtime for line crews is eliminated.

▲ **PLUSH CAFE at Wisconsin Electric's Milwaukee building eases eating crush, displays modern commercial equipment**

Employees' Club Scores a Hit

. . . with management, too, as prospects for retaining high grade work force improve and 'on-the-job' demonstrations help sell commercial prospects

Wisconsin Electric Power Co's investment in an employees' club has been paying off. In three-and-a-half months since its opening, "an improvement in employee morale is already evident in the enthusiastic way in which employees use and enjoy" facilities, says G. W. Van Derzee, chairman of the board. And ultra-modern lighting, air conditioning, and cooking equipment is making every visiting businessman a potential prospect.

The utility faced a problem familiar to many downtown Milwaukee businesses—inadequate facilities for workers' relaxation and meals within the building and jam-packed, sometimes inferior restaurant service outside. Now a cafe that seats 275 persons, a comfortable lounge, and banquet and reading rooms serve about 1,300 employees working in or near WEP's Public Service Building and their guests. Other workers, most of them with similar—but not so luxurious—facilities, are welcomed from distant offices and divisions. Retirees have their own reserved reading room.

Opened without fanfare after the Fourth of July, the club boasts an all-electric kitchen, which the company describes as the most modern in the U. S. Its design and equipment was approved by WEP's commercial cooking sales people with an eye toward selling commercial prospects. Up-to-date architectural features and color schemes provide a layout which sales engineers can use to close lighting sales. Fluorescent and incandescent equipment has dimmer controls, and cool or warm colors.

The club is covered by a sound system with concealed speakers. Normally the system will carry canned music, but sound circuits in each room can be separately controlled for

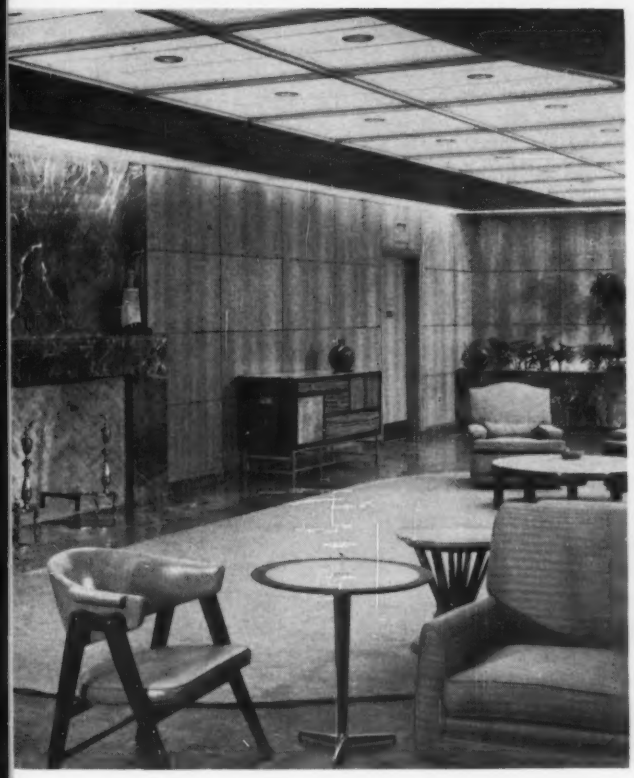
program and volume. Air conditioning has separate controls, too, for cool or warm filtered air. Perforated metal pan ceilings provide draft free cooling or heating and sound-conditioning.

Other features include five cafe banquettes with a total capacity of 35 persons; three dining rooms—one for company officers, the others for occasions like engagement and maternity showers and going-away luncheons; projection equipment for movies and slides; card tables; "picture window" murals and paintings; a two-section cafeteria counter—one for quick-order sandwiches, another for hot dishes; three aquariums; and TV.

Company officials view the employees' club not as a paternalistic contribution but as a prudent move to achieve a stable work force of highly qualified employees, and, at the same time, display the benefits of modern electric cooking, lighting, and air conditioning.

RETIREES' ROOM is popular place for cards, chats, television, and reading

▼ LUXURIOUS LOUNGE provides movies, games, and TV for WEP workers from 10AM to 4PM on weekdays



▼ ALL-ELECTRIC KITCHEN equipment ranges from soup pots to vegetable peelers, and includes a baking shop

New Hope for Abandoned Project?

Passamaquoddy tidal power project, dropped 20 years ago, may be revived; meanwhile only relics remain

A large-scale program aimed at harnessing the mighty tides of Passamaquoddy Bay, abandoned about 20 years ago after Congress failed to appropriate the funds necessary for continuance of the project, may soon be revived.

Plans for the development of an international tidal power project at Passamaquoddy Bay, located between Washington county in northeastern Maine and southern New Brunswick, were discarded when Congress refused to appropriate more than the $5 million that had already been spent on preliminary work.

Now, 20 years later, new interest in the project has stirred Congress to appropriate almost $1 million toward a new $3-million survey. Test borings for possible sites for a series of dams are scheduled to get under way sometime in the near future.

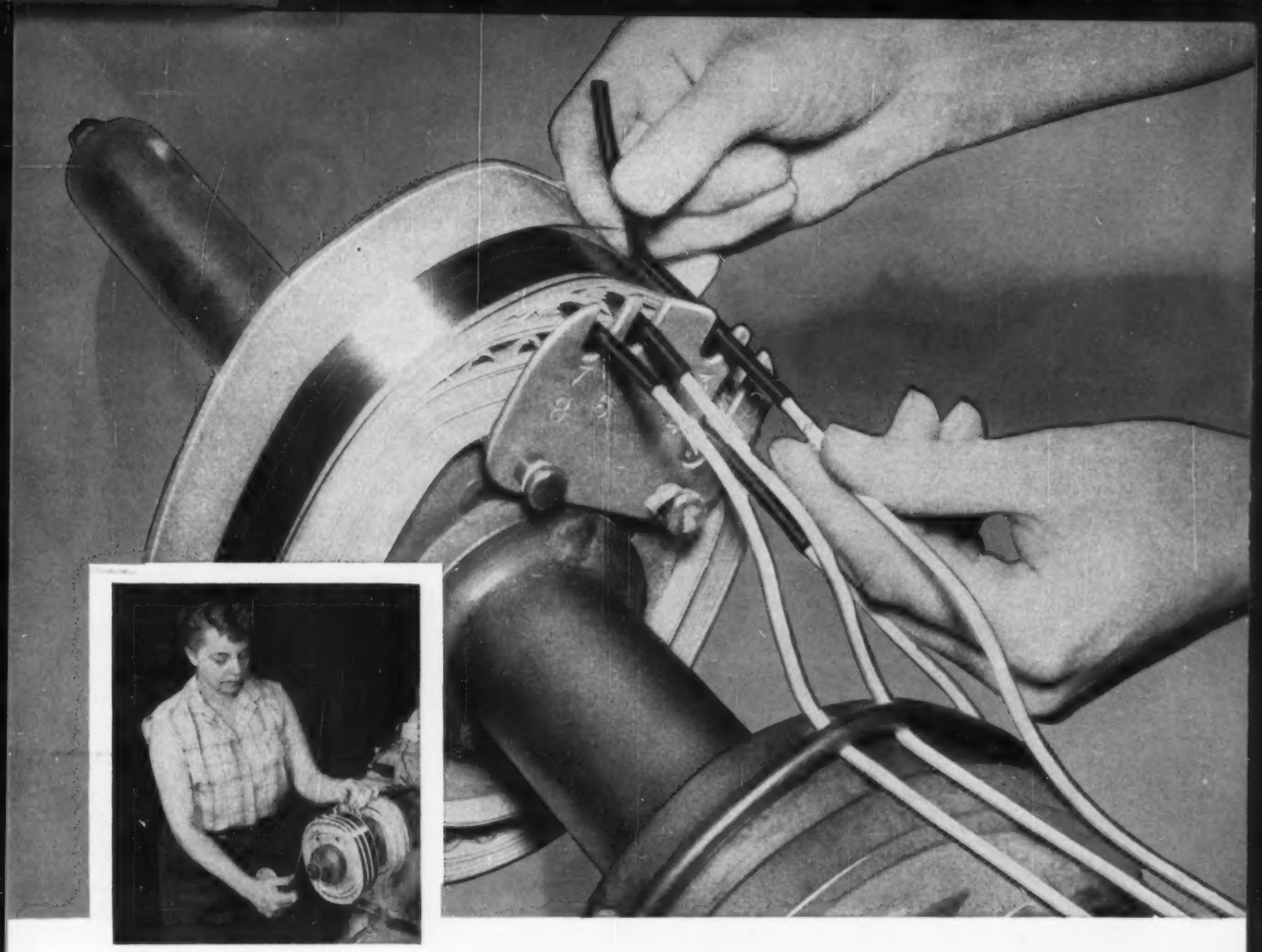
Meanwhile, a former working model of the original proposed development remains, stored in one of the housing units built by the government 20 years ago at Quoddy Village, outside Eastport, Me. The model is examined (above, right) by Arthur Stevens and his son Arthur, Jr. Stevens is manager of the village for the Boston salvage concern which later purchased the property.

A deserted turnstile to nowhere, viewed by Stevens in bottom photo, once counted the thousands of workers on the project. In the background can be seen a portion of the village of 100 housing units constructed by the Army Corps of Engineers, in preparation for work on the project. When plans were abandoned, Quoddy Village passed from one government agency to another before it was sold as war salvage for a fraction of its original cost. A large number of the homes were later restored and either sold or rented.

The little town of Eastport, located nearby, boomed in 1935 when the project was started, and went through a bust the following year when it was abandoned. The town now hopes for another boom.

FORMER MODEL remains at site of forsaken project

RETIRED TURNSTILE: Will it again become active?



She's tapping through five metal fingers to position each POLE STAR lead

The method of positioning high voltage tap leads typifies the degree of accuracy called for in the production of Pole Star distribution transformers. The experienced and highly skilled winding machine operators undoubtedly could bring out the taps with almost perfect accuracy with no mechanical aids. Because there *is* a possibility of error, however, all high voltage tap and line leads are precisely located with metal templates, as shown above. Thus, there can be no slight variations to complicate later assembly or place unnecessary strain on connections.

Similar production-control methods are used in other stages of Pole Star coil production. Windings are accurately positioned between the folded edges of kraft layer insulation . . . heavy, low voltage leads are prebent to the desired radius on a jig, then are clamped in position during winding . . . adjustable devices permit the proper wire tension to be maintained throughout the winding, assuring a "tight" construction.

All of these things mean greater coil uniformity — a major factor in the outstanding dependability for which Pennsylvania's Pole Star distribution transformers are noted from coast to coast.

167 Production Controls make Pole Star Best!

3 through 500 kva, through 67,000 volts

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** Greater Pittsburgh District

pt POLE STAR

Savings on Poles Cited to ASTM

Sg strength test could save $2.5-million a year for pine poles, Los Angeles meeting told. Pole supply reported as equal that of 1947

Findings of the society's pole research program point to the use of specific gravity in rating the strength of untreated poles, the American Society for Testing Materials heard at its Second Pacific Area Meeting, Sept. 16 to 21, at Los Angeles.

In four or five tree species tested, a relation between strength and specific gravity appears to be independent of species, L. G. Smith, Baltimore Gas & Electric Co, declared. Use of specific gravity in determining strength, he said, would allow use of smaller poles for the same strength, with consequent savings in treating material cost and freight charges. Creosote and freight costs are more than 40% of the cost of creosoted Southern pine poles delivered in the East, so that the specific gravity rating offers pole users an annual saving of about $2.5-million for pine poles alone, Smith said.

Cites Same Saving

Smaller pole size, he added, could affect the cost of the raw pole also. The supplier buys stumpage and selects trees, only an eighth of which yields poles of one length and class and a third of which furnishes poles within a range of 5 ft in length and 4 in. in circumference. Use of the specific gravity rating may increase the spread of these dimensions, Smith opined.

E. E. Matson, Pacific Northwest Forest and Range Experiment Station, Forest Service, Department of Agriculture, noted that present demand for wood poles is about 5-million units. Southern yellow pine, he said, remains in greatest demand although Western species will become more important as long lengths become scarce in other areas. He cited Forest Service estimates to show that pole supply for all parts of the country is now at least as good as in 1947. No great improvement, Matson added, will come until 1975.

A 50¢ per-pole saving through more precise strength evaluation should bring a $2.5-million annual saving to pole-using industries, said L. J. Markwardt, of the Forest Products Laboratory, Forest Service, Department of Agriculture. He said that about $200,000 of the $254,000 goal has been raised for the pole research program in which the ASTM and the University of Wisconsin are cooperating.

Urges Controlled Drying

Users are reluctant to adopt the slab-gain and flat-roof methods of gaining employed successfully by the Bell System for Southern yellow pine, said George Q. Lumsden, Bell Telephone Laboratories. Controlled drying or more care in shaving, he said, could reduce the breaking away of wood at knot clusters in machine-shaved poles. Well-controlled artificial drying by the producer, he continued, would save the user thousands of dollars annually in freight and might help overcome the tendency toward injurious checking.

Lumsden noted that when poles of different sizes are separately treated with preservative, the smaller poles benefit in strength and the larger ones through better distribution and penetration of the preservative. More study of petroleum carrier characteristics, he said, might lead to specifications for preservative carriers that are truely non-bleeding or that evaporate rapidly at or about the critical non-bleeding retention level.

Joint-Use Poles Scarce

A mixture of pentachlorophenol and creosote, rather than either preservative alone, seems more effective against a wider range of organisms, particularly the fungus, Lentinus lepideus, Lumsden continued. The mixture reduces the retention level, and the penta has a greater solubility in creosote than a good petroleum. Because of the shortage of poles of joint-use sizes, he said, there seems to be no immediate solution to competition between telephone and power companies for such poles.

R. G. Mastin, Cities Service Oil Co, proposed an oil testing service whereby generating plant operators would send periodical samples to the oil producer's laboratory. Such a service, he said, would be tantamount to having the turbine in the laboratory.

Mastin advised against mixing of oils by the operator. He said that oils in good condition after ten years have an excellent chance of performing satisfactorily for the life of the turbine. An antirust additive, he said, can be added with make-up oil to maintain rust protection, and an interfacial tension value test will indicate the amount of antirust additive remaining in the oil.

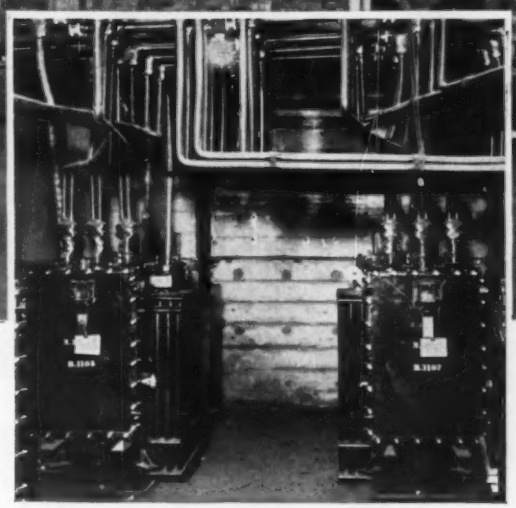
Positive Venting Best

Positive venting—a forced passage of air through the oil sump vapor space—is the most rapid, effective means of removing water from a turbine oil system, said N. W. Furby and F. J. Hanley, California Research Corp, and J. A. Vincent, Standard Oil of California. Four times as much water can be removed in a given time from a vented sump by raising oil temperature from 100 to 150F, they pointed out.

A "rust alarm" in an oil system, they said, should indicate a pro-rusting condition before the governor stops. Pro-rusting conditions, they said, could be detected by test strips of freshly sandblasted carbon steel.

Field experience shows that fire-resistant turbine lubricants lubricate satisfactorily, remain essentially unchanged in service, form no excessive deposits, separate readily from water, and provide adequate rust protection. Thus said G. H. S. Snyder, L. W. Manly, and N. V. Messina, Socony Mobil Oil Co.

These lubricants, tney added, have a greater tendency to foam and entrain air than petroleum oils have, and their viscosity decreases only moderately when a viscosity index improver is used. But slight turbine design changes and minor product modifications, they said, alleviate foaming. These speakers told the ASTM that field tests showed that fire-resistant lubricants have a solvent effect on paints, insulating lacquers, and some seals and sealing materials.



This underground network vault with its array of cables is typical of the up-to-date installations demanded by Pacific Gas and Electric Company in order to render maximum continuity of service to their customers.

Dependable service below pays off above

Pacific Gas and Electric Company's recent installation of nearly seven miles of Keystone-insulated duct cable is just one part of its continuing network expansion to insure dependable power for San Francisco's ever-increasing loads.

Meeting the rigid RO & N Specifications set up by Pacific Gas and Electric Company engineers, Keystone-insulated cables offer extra value in their high dielectric strength, moisture resistance, resistance to ozone and corona cutting, and in their ability to take sharp bends and withstand high conductor temperatures. Insulation and sheath are vulcanized together in a construction that withstands the moisture and heat in duct systems and allows simple, damage-free pulling.

Backed by Okonite research and quality control, Keystone-insulated cables offer these service-lengthening features without any increase in cost. Figure your cost in terms of service and Keystone is your best buy.

Get the complete story on Keystone-insulated cables today. Contact your Okonite salesman or write for Bulletin **EW463** to The Okonite Company, Passaic, N.J.

4188

where there's electrical power . . . there's **OKONITE CABLE**

Compare

✓Check

On-the-Spot Service is Key to Savings with Allis-Chalmers Regulators

LIVE BETTER ELECTRICALLY

ALLIS-

Regulator Servicing

these savings

All it takes is a 2-man crew and a pickup truck to handle 99% of the service requirements of Allis-Chalmers regulators. The reason — UNIT CONSTRUCTION.

"Unit Construction" eliminates piecemeal inspection — a long time-consuming process.

With Allis-Chalmers regulators, a 2-man crew arrives in a pickup truck, sets up the hydraulic jack and, in a matter of a few minutes, has lifted the regulator far enough out of the tank for inspection. There's no need for large crews and expensive equipment to move and untank the regulator.

Estimated hourly cost of crews is about $9 for a 2-man crew and about $18 for a 4-man crew. A saving of at least $9/hour. The picture at left tells at a glance the story of easy maintenance with Allis-Chalmers unit construction.

This is only one point of comparison. For the complete story, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

CHALMERS

A-C ALLIS-CHALMERS

A-5142

SPEAKERS at SEE's transmission section included (usual order): J. D. Shaw, Virginia Electric & Power; R. W. Sherwood, Gulf States Utilities; L. S. S. Smith, Stone & Webster; E. A. Roberts, Georgia Power; Dr C. F. Wagner, Westinghouse

SEE Hears Utility Progress Talks

Richmond conference, Sept. 20-21, gets reports on pole preservation, fiber-glass poles, rotor pre-warming, new 230-kv transmission line

Wood poles treated by a new process survive for long periods in any soil, the Engineering and Operation Section of the Southeastern Electric Exchange was told at its conference, Sept. 20 and 21, at Richmond, Va.

The process utilizes copper formate and heat to bring about chemical union of copper and cellulose, E. P. Boynton, National Cylinder Gas Co, told the conferees. He added that copper in the range of 0.4 to 0.6% by weight is enough to provide this prolonged protection.

Fiber-glass Poles Ready Soon

W. B. Swan, Line Materials Co, reported that machines are being installed at Gar Wood Industries for producing fiber-glass poles and crossarms and that quantities for 60 to 90-day delivery will be available. Prices, however, will remain very high.

Young engineers will stay with a utility company when certain conditions are assured them, said Hubert W. Goulthorpe, General Electric Co. He urged utilities to keep young engineers busy at work worthy of the abilities, where they can develop enthusiasm, at salaries competitive with those outside, and with promotion in prospect.

Standards for voltage and reliability are important in intelligent planning, declared J. W. Graff, Alabama Power Co. When these standards are poorly defined, he continued, the tendency is to overbuild.

Better utilization of skilled manpower is an important motivation in the use of computers, the general session was told by E. E. George, Ebasco Services, Inc. Computers relieve engineers of routine work and make them available for assignments commensurate with their abilities.

Computers, George said, not only do jobs more economically but also extend the range of work that can be done economically. He pointed out that the computer's more complete and accurate data provide better plans and designs.

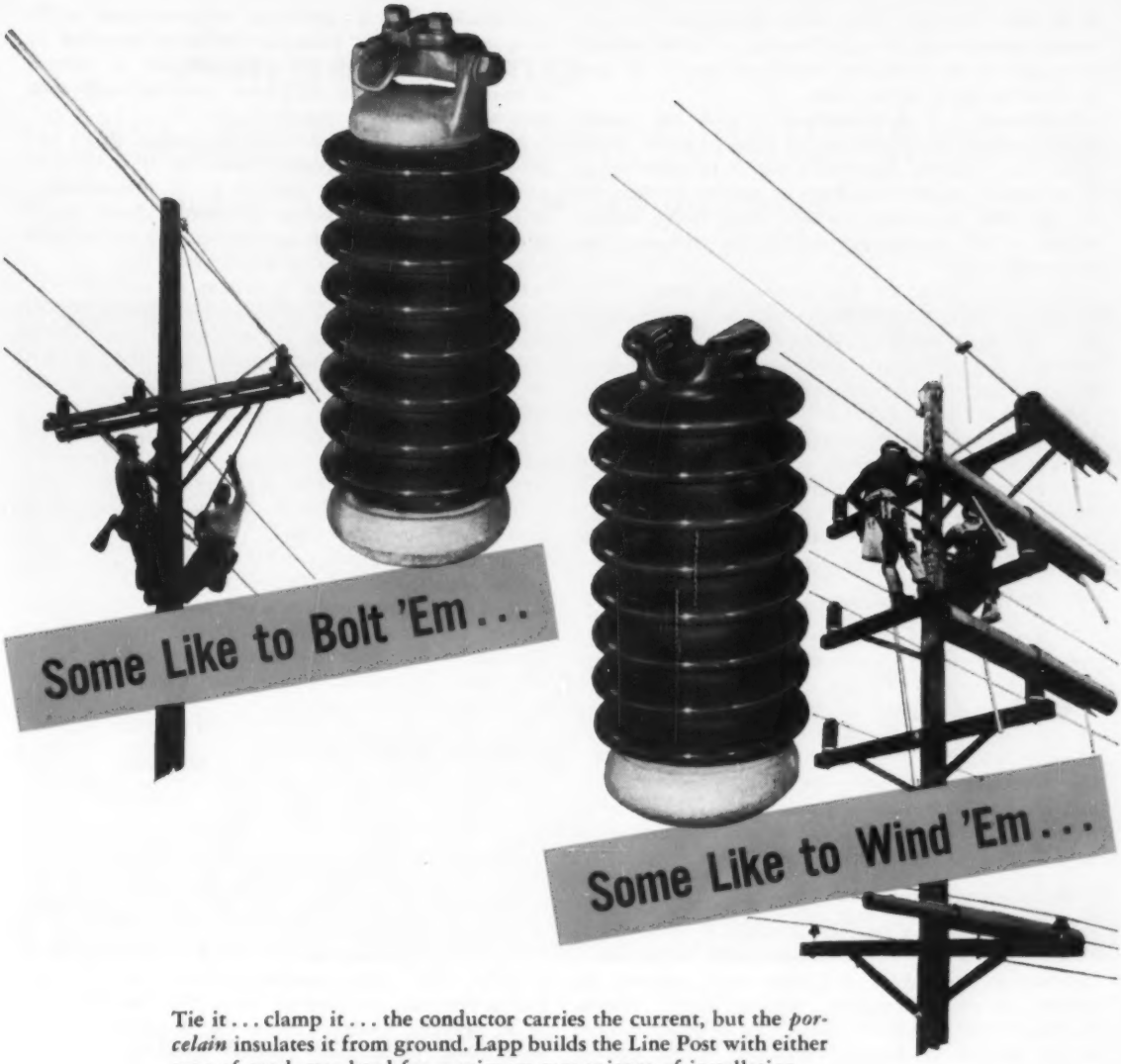
Insurance coverage remains a great problem in the development of nuclear power, said J. W. Landis, Babcock & Wilcox Co. As insurance companies cover damage only up to about $60-million, Landis said, the government should insure for greater losses.

C. R. Allen said, Southern Bell Telephone & Telegraph Co prefers to purchase rather than lease motor vehicles. A construction truck, he said, is usually required for somewhere between $65,000 and $75,000 worth of outside plant construction work per year, a maintenance truck for every 1,000 telephones in service, and an installation truck for installing an average 100 telephones per month.

Passenger cars for supervisory personnel, Allen said, are needed in a ratio of 1 for every 8 work units. He added that service age has increased from 4.7 years per vehicle at retirement during 1930 to an average of 6.7 during 1955. Operating cost per mile Allen put at 8.1¢ in 1930 and 8.9¢ in 1955.

The $450,000 gas explosion in the coal tripper room above bunkers at Philip Sporn Station last July 18 occurred when water was used to extinguish burning coal, revealed H. E. McCormack, Appalachian Electric Power Co.

Equipment and personnel available are equal to the job of pre-warming a large generator field rotor during starting, said GE's W. J. Gilson. In describing this procedure for improving the ductility and notch toughness of field rotor forging, he said the objective was to heat the inner part of the rotor under the coil slot to about



Tie it . . . clamp it . . . the conductor carries the current, but the *porcelain* insulates it from ground. Lapp builds the Line Post with either type of conductor head for maximum convenience of installation . . . and it builds the *porcelain* to do the *insulating* job. The porcelain in either case is a closed-end post, of high density vacuum-process electrical porcelain. It won't puncture because it has no conductive material within it. It outperforms any other type of insulator in dirt conditions because its fog-type design prevents leakage flashover from non-uniform leakage resistance. It stands up under arcover, stones and bullets because its short, sturdy petticoats protect the body. And it won't crack because its hardware, both top and bottom, is *externally* attached, and can load porcelain only in compression.

With tie-wire or clamp-top, the Lapp Line Post will give you an *extra* margin of operating security, low upkeep, long life.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

60 to 65C (EW, Oct. 15, p 137). He explained a preheating method which involved varying the exciter voltage by means of the associated amplidyne control to give 40 to 60% rated exciter volts.

Low-temperature carbonization of coal will reduce electric utilities' fuel bills within three to seven years, declared E. W. Lang, Southern Research Institute, basing his prediction on the availability of suitable markets for the tar. This by-product, he said, must return enough income to pay for the 20 to 25% fuel loss and carbonization costs.

Mississippi Power Co has been saving money since its purchase of hydrogen cylinders six years ago, reported M. E. Lucky. Demurrage alone, he said, paid for the cylinders so that the time saved on accounting, billing, checking, and tracing is clear profit.

A production session was told by E. M. Powell, Combustion Engineering Co, that a recent survey of user experience attributed advantages to controlled circulation over natural circulation boilers. Controlled circulation boilers, he said, have quicker response to changes in fuel input, improved drum level control characteristics, and a starting cycle that can be carried out more rapidly.

200-250 Mw to be Average

Noting that reheat boilers have nearly doubled in size every 10 years, Powell predicted that by 1960 the average size will be between 200 and 250 Mw.

A canned motor pump is satisfactory for boiler service and potentially suitable for other power station applications, declared J. R. Slack, Virginia Electric & Power Co. He reported the one-year operating experience of his company with such a pump on boiler circulation service in a unit rated 750,000 lb per year, 14.50 psi, 1,000/1,000F at the Possum Point Station.

Tube Structures Developed

Efforts to design a steel structure for a 230-kv transmission line at the same cost per mile as wood-pole construction resulted in a tubular steel structure dependent on guys for stability, reported E. A. Roberts, Georgia Power Co. Each pole of the structure consists of two sections of tapered steel tubes bolted together in the field by means of flanges welded to the large end of each tube.

Roberts gave comparative costs for the new line and for a braced wood-pole line; these were $28,673 and $25,525 per mile, respectively.

J. D. Shaw and L. S. S. Smith explained Virginia Electric & Power's reasons for resorting to 230-kv transmission. The reasons cited were the scarcity of rights-of-way, increased capability, and the prospective easier interconnection with neighboring companies at this voltage. Mechanization, they pointed out, speeded and reduced the cost of constructing the 96-mile line from Chesterfield to Possum Point Station.

Two-ground-wire construction should be used for 230-kv transmission lines as two wires are better for any given range of probable lightning stroke characteristic, it was suggested by Dr C. F. Wagner, Westinghouse Electric Corp. He said that a new approach to calculating lightning performance probably explains the inordinately high number of lightning flashovers reported on 230-kv lines of the Ohio Valley Electric Corp and the Indiana-Kentucky Electric Corp.

Ground-line and fire-protection treatments used by his company to prolong wood-pole life were described by J. W. Kirkland, Gulf States Utilities Co. It consists of brushing on creosote and a toxic liquid and application of a sealer. Cost per pole is $4.32.

An airbreak switch satisfactorily switched single and parallel high-voltage capacitor banks up to 6,000 kvar capacity in recent tests, reported L. F. Meisenheimer, Duke Power Co. The switch successfully closed in and interrupted single banks of capacitors from 2,400 to 9,600 kvar in progressive steps of 1,200 kvar.

He noted, however, that in making the repeated tests at 8,400 and 9,600 kvar, the quick-break attachment of the airbreak switch failed to interrupt the load current and set up an arc across the contacts. The arc had to be interrupted by opening the back-up oil circuit breaker.

Underground capacitors should be installed only to correct voltage during a feeder outage, F. G. Hammer, Southern Services Inc., told a distribution session. Capacitors on underground secondary networks, he added, cannot be financially justified. All factors considered, the most such capacitors provide is a slightly lower cost.

Four standard cutout makes performed unsatisfactorily on high or low-current tests conducted by Duke Power Co, related Frank W. Edwards. Single vented cutouts interrupting low currents would not clear high faults, and controlled vented cutouts interrupting high faults would not clear low ones.

Capacitors Satisfactory

The tests, he said, were for determining which available cutouts, could be used on Duke Power's 13.8/23.9-kv systems. These systems, he pointed out, have symmetrical faults up to 2,550 amp and asymmetrical values 1.63 times greater. Edwards said that symmetrical currents up to 150 and 2,700 amp were applied to cutouts at 23.9 kv during the tests.

No voltage problem has arisen with 240-v capacitors in series with 2.4-kv transformers, and the capacitor failure rate has stabilized at about 7% annually, said A. R. Milliken, Electric Utilities Co. Reporting on 531 installations, representing 220,000 operating days, on the Public Service Co of Oklahoma system, he said that only three interruptions were caused by capacitors. Milliken noted that ferro-resonance and subsynchronous resonance have caused only minor problems and that there has been no trouble attributable to increased short-circuit current.

Vacuum Switches Have Future

Vacuum switches appear to have a large future in the utility industry, stated J. W. Rittenhouse, Hi-Voltage Equipment Co, noting, however, that developmental work must still be pursued. He said that their first use may be for switching pole-top capacitor banks and substations of as much as 5,000 kva at 33 kv and for dropping lines.

R. W. Baker, Georgia Power Co, reported development of five new curves showing diversified demand per customer vs number of customers. Use of the curves permits more accurate determination of transformer capacity for serving five classes of customers having different groups of appliances. An interesting conclusion from the curves, Baker said, is that the diversity among customers is more pronounced than expected.

range-taking

TRANSFORMER GROUNDING CONNECTOR type EQC

fits all standard EEI-NEMA distribution transformers . . . no stress corrosion cracking

here are features your line crew will appreciate:

- easy one-wrench installation
- wide range . . . from 8 sol. to #2 str. copper
- rotation of connection eye allows vertical or horizontal installation

For other grounding problems . . . write for Burndy Grounding Catalog G 47

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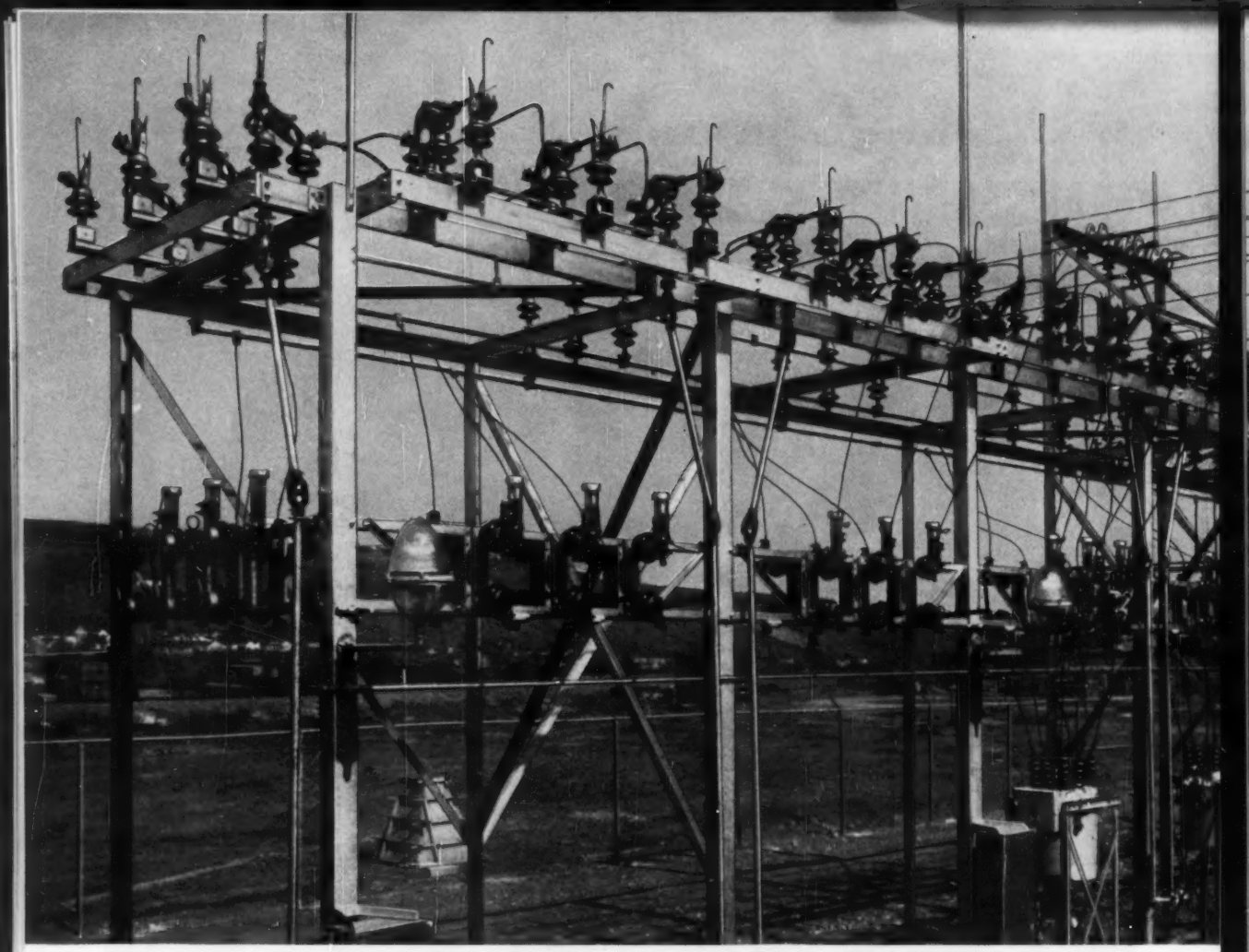


Nine L-M power switches and 20 hook switches at the 13.8 kv 20,000 kva switching center of a Northwest utility. L-M also furnished other equipment and apparatus.

How L-M Switch Design Insures High Thermal Capacity, Positive Operation

High-pressure silver-to-silver contacts provide cool operation; powerful lever advantage to open and close switch insures easy operation at all times.

by **HARVEY BAERWALD**
Sales Application Engineer
Power Switching And
Substation Section
Line Material Company

Line Material has designed high thermal capacity and trouble-free operation into its line of power switches. Powerful lever advantage of the operating mechanism and silicone-grease-lubricated and sealed bearings at all moving joints insure positive operation to open or closed switch position regardless of ice, corrosion, or long periods of non-operation.

Tremendous Lever Advantage

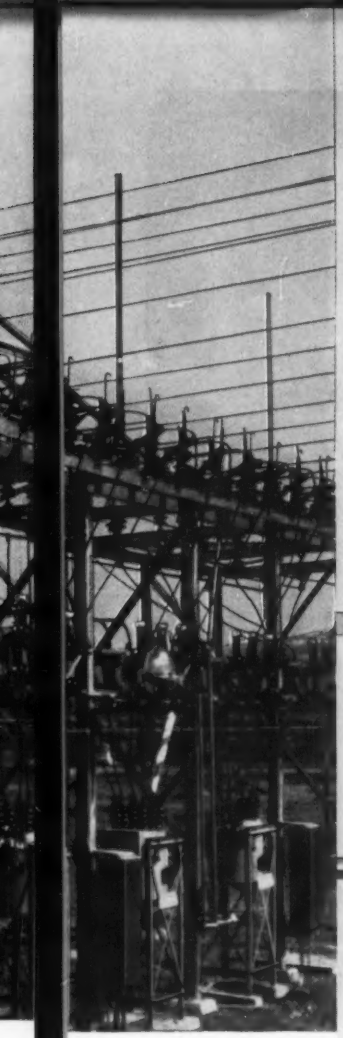
Operating mechanism provides a tremendous lever advantage by utilizing unique rotating switch blade design. Before the blade even begins to rise in the contacts, it is rotated 26 degrees—the full force is applied to blade rotation, breaking any possible condition of ice, corrosion, or contamination.

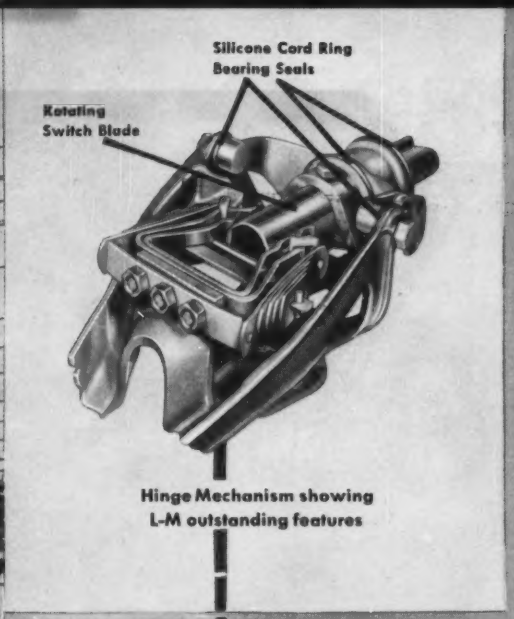
Smooth, Easy Operation

The hinge operating mechanism also provides smooth, positive blade rotation and blade rise. All bearings and all moving joints on the switch and on the interphase mechanism assembly are silicone-grease-lubricated for life and positively sealed with silicone cord rings.

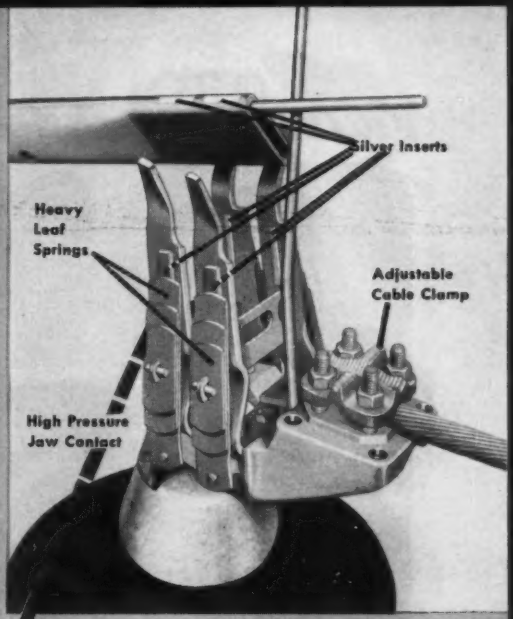
LINE MATERIAL

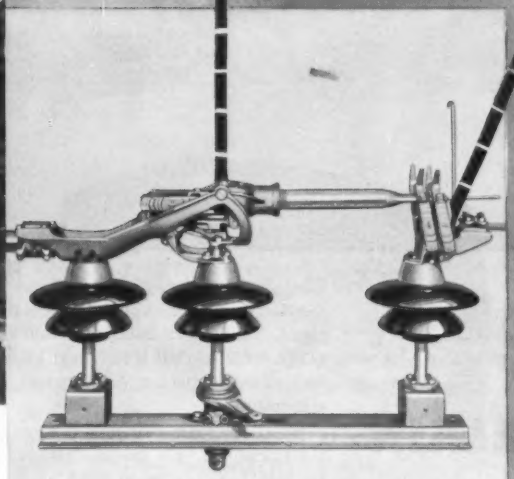
A McGRAW ELECTRIC COMPANY DIVISION



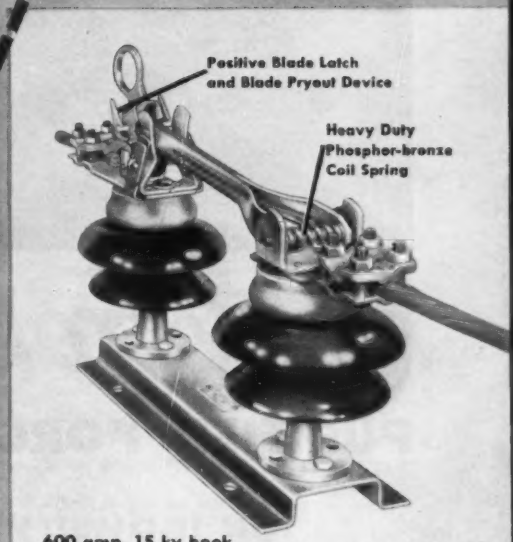


Hinge Mechanism showing
L-M outstanding features





1200 amp. 34.5 kv vertical break
type PV switch



600 amp. 15 kv hook
stick operated Disconnect Switch

Grease can't get out; water, dust, or dirt can't get in to freeze or start corrosion.

On 69 kv ratings and above, a counter-balance spring is provided to counteract blade weight. It is a self-centering, double coil, floating spring which is positive acting and trouble-free.

High Thermal Capacity

L-M's power switching equipment provides extremely high thermal capacity for both continuous current and short-time high current carrying applications.

Silver inlays in both blade and contact shoes insure high current-carrying capacity at both jaw and hinge contacts. During the closing operations, blade rotation provides a wiping action assuring clean silver-to-silver contact surfaces.

The jaw contact assembly has large copper shoes which exert 175 pounds pressure on the silver-to-silver contacts. This high pressure is maintained by heavy leaf springs to provide uniformly high thermal capacity.

L-M's power switches also have fewer current interchange points because the terminal connectors are designed as an integral part of the contact adapter.

Simple Construction

Turnbuckle interphase adjustments make L-M group-operated switches easy to install. Flexible interphase mechanism assures positive operation without periodic maintenance, even after the structure has become severely distorted.

Get Complete Information

Ask your L-M Field Engineer for information and bulletins on L-M's Power Switching Equipment. Or write Line Material Company, Milwaukee 1, Wis.

Power Switching Equipment

VICTOR PROGRESS REPORT #5

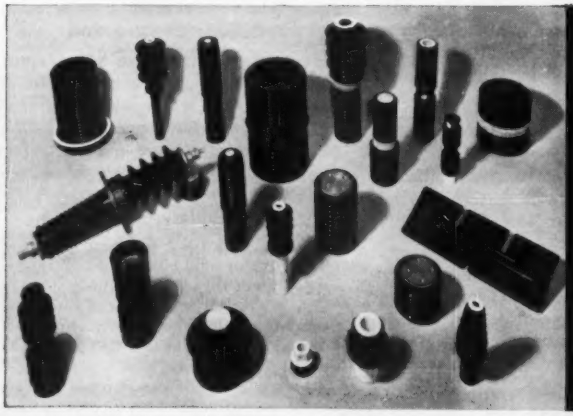
VICTOR

PURIFIED PORCELAIN

the Industry's standard for Special Shapes!

The hydraulic testing machine shown above is located in Victor's special porcelain testing department. Insulators such as these open cutouts are given a calculated transverse load before electrical test. The inspector on the left is checking hole alignment.

Starting with *Purified* Porcelain—finest insulator porcelain ever made—all special shapes made by VICTOR undergo rigid quality controls, tests and inspections to assure users of the best insulating materials money can buy. If you need special shapes required in cutouts, circuit breakers, pothead, capacitors, switchgear, transformers and other electrical equipment, choose the best! Choose VICTOR!



SPECIFY VICTOR

Purified Porcelain Insulators!

I-T-E

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
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Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain
Insulator Hardware

A-Plant Seen Competing by 1980

- **Atomic Industrial Forum at Chicago is told why reduced utility fuel costs will not affect customers' bills appreciably**
- **Turbine performance seen only limit on sodium-graphite reactor steam temperature—Other reactors cited**
- **Designer's task said to involve cost paradoxes, and radiation problems seen dictating safe system design**

Progress in nuclear power plant development will make such plants competitive with conventional plants in many high-fuel-cost areas well before 1980, the Atomic Industrial Forum heard at its annual conference Sept. 24 to 28 at Chicago.

In making this prediction, O. B. Falls, General Electric Co, told the conference that this development should not lead customers to expect drastic cuts in their utility company bills. Fuel charges, he pointed out, account for only 16% of the total cost of power; and were nuclear fuel to reduce fuel outlays to zero, the customer's bill could drop only by that amount.

Fixed Costs Presumed

This figure, Falls said, presupposed that transmission and distribution costs would remain fixed. But these costs would increase if utilities were forced to use remote sites for their A-plants, he continued, adding that concerning nuclear power costs he had reached these conclusions:

1. Use of a reactor would not cut the cost of other plant components. If anything, such costs may be slightly higher because of the poorer quality of steam.

2. While building reactors is more expensive today than building conventional steam generators, more experience in construction and operation and more new equipment, accompanied by a gradual decrease in research and development, should cut future equipment costs. Capital costs of large A-plants should drop at least 25% in the next decade and 35% by 1980.

3. But nuclear fuel costs cannot drop fast enough to make this fuel competitive with coal in the next five years.

Discussion brought out that surveys indicated that conventional fuel costs are not likely to rise substantially in the next 25 years. Accordingly, nuclear fuel's competitive position will continue to depend largely on technological progress.

The promise of economical nuclear power from the sodium-graphite reactor is premised primarily on its ability to operate at high temperature and low pressure, said Dr Chauncey Starr, North American Aviation, Inc. Its engineering development and heat extraction system, he said, may eventually permit production of steam temperatures limited only by turbine performance.

Dr Starr gave figures predicting a busbar cost of 11.5 mills per kwhr for a 75-Mw and 9.4 mills per kwhr for a 150-Mw sodium-graphite reactor plant. Noting the uncertainty of fuel costs, he said that his assumption of a fuel cost of 2.2 mills per kwhr was based on a credit of 2.9 mills per kwhr for plutonium produced in the reactor.

Key to Economy Cited

W. T. Moore, Babcock & Wilcox Co, said the key to economical nuclear power is cutting the cost of fuel element fabrication and chemical reprocessing, and the optimization of plant design to effect these reductions. A session, considering the pinpointing of reduceable nuclear power costs, heard papers that demonstrated the difficulties that arise in making plant estimates.

William Loeb, Nuclear Development Corp of America, cited the difficult choices facing a reactor designer. A particular design, he said, may reduce capital charges while making the fuel element and its reprocessing more expensive. On the other hand, the homogeneous reactor, he said, reduces fuel fabrication and reprocessing costs but involves the risk of corrosion and possibly excessive maintenance. Radiation, he added, is a problem continually plaguing the designer who must follow its dictation in locating equipment and in providing the number and location of openings in the reactor and—what is most important—the facilities for a safe system.

Reduction Unlikely

A fuel element fabrication cost reduction is unlikely in the foreseeable future, particularly while designers call for recycling of fuel elements, said Bruce Old, Nuclear Metals, Inc. He predicted that a future requirement of higher operating performance would tend to boost the cost of fuel elements. He disclosed, however, that fuel element fabrication cost was reduced sixfold for the Materials Testing Reactor between 1952 and 1954.

George Jenkins, Union Carbide Nuclear Co, citing the tremendous capital investment required for reprocessing facilities, said that the profit available from this phase of the nuclear industry is indeed small inducement for the metallurgical industry. He said that hope of increasing the incentive centered largely on radiation chemistry which may develop to an extent where waste products could be made profitable.

Choices Up to Designer

W. E. Kelley, Walter Kidde Nuclear Laboratories, Inc, declared that a $50-million plant of current design requires $3.9-million of protective facilities. Reactor designers, he said, base safety plans on a combination of the worst possible circumstances rather than on the most probable accidents.

A session on future reactor concepts discussed the following:

LMFR Has Advantages

The Liquid Metal Fuel Reactor (LMFR) offers a means of harnessing the thorium breeder in the thermal range. This homogeneous reactor with its uranium fuel carried in molten bismuth metal, offers:

1. Operation at high temperatures.

2. The possibility of incorporating

the fuel reprocessing system in the reactor plant.

On the other hand, corrosion remains an important problem to be solved.

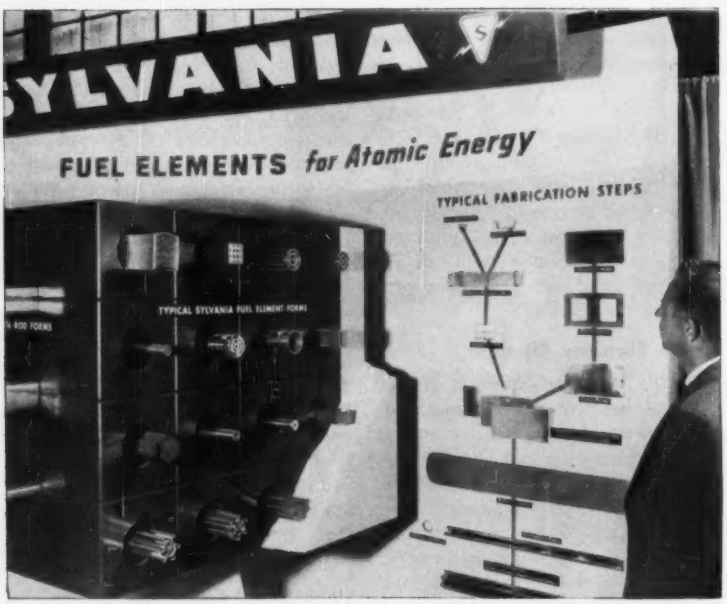
A reactor moderated, reflected, and cooled by a hydrocarbon, called the Organic Moderator Reactor Experiment (OMRE), operates at low pressure without corrosive effects on standard construction materials and chemical reaction with uranium. On the other hand, most hydrocarbons are unstable when exposed to heat and radiation and are poor heat-transfer media.

The nuclear reactor-gas turbine power cycle has simplicity, high thermal efficiency, and small stored energy in the coolant system compared with the pressurized water reactor. Its problems are fission product leakage and cracking of steel structural material when molecular nitrogen is the coolant.

The sodium cooled-deuterium (heavy water) moderated reactor combines what is widely considered to be the best coolant and moderator although this combination involves the inherent danger of the mixing of these materials. Nevertheless, this reactor can be recommended for its good steam conditions without a pressure vessel, small size, and low fuel enrichment.

In discussing plant insurance, H. W. Yount, Liberty Mutual Insurance Co, recommended that these factors be weighed: type of reactor and its use, power level, location, and containment. S. B. Roboff, Sylvania Electric Products, Inc, called for more high-flux testing reactors for nuclear materials to help maintain the U.S. atomic position.

"No accident to any reactor with which I am acquainted," C. R. McCullough, United States Atomic Energy Commission, told the conference, "could produce a bomb-like explosion. The public outside the plant cannot be endangered by blast. The principal hazard which must be evaluated is the possible release, as a result of an accident, of the highly toxic fission products which are contained in the reactor."



Making of Atomic Fuel Demonstrated

Step-by-step process of making a fuel element for a reactor is illustrated by Sylvania Electric Products, Inc, at trade fair held in Chicago in conjunction with the Atomic Industrial Forum. Fuel-element and control-rod shapes for different reactors are mounted in simulated graphite-moderated atomic reactor. Elements produce nuclear chain reactions in which atomic energy is released; rods control rate of reaction, hence, energy release rate

SWPA Losses . . .

. . . for 1955 operation vindicate Administration's support of higher rates

An audit report from the Comptroller General vindicates the Eisenhower Administration's desire for higher rates for the Southwestern Power Administration.

Covering 1955 operations of SWPA and Corps of Engineers activities in the Arkansas, White, and Red River basins power systems, the report shows that $5.5 million extra would have been required to "cover the costs of producing electric energy, and to amortize the government's investment applicable to power."

A report on operations of the Southeastern Power Administration and the southeastern power system of the Corps of Engineers came out at the same time. This system, according to Comptroller General Joseph Campbell, was short $3.4 million in 1955.

According to financial statements in Campbell's report, cumulative net losses on power operations to June 1955 from inception of the projects total $13.4 million for SWPA, and $12.1 million for SEPA.

During the last session of Congress, the Department of the Interior drew heavy fire from public power supporters for proposing increased power rates for SWPA. Efforts to block the move culminated in the Kerr Bill, which would have frozen all federal power rates for 18 months. But Eisenhower vetoed the bill.

Both reports underscore financial losses incurred in power operations on these systems, and both call for Congressional action to resolve the confusion and lack of criteria in allocating construction costs.

Campbell notes: "None of the construction cost allocations are final. The construction costs allocable to power and the repayment requirements must be finally determined before power rates can be properly established in accordance with the . . . Flood Control Act of 1944.

"We believe that the lack of policies and criteria to be applied in making allocations of construction costs, and the existing confusion on responsibility for making these allocations, should be resolved by legislative action."

mounts quickly, easily
in existing 25-kvar brackets

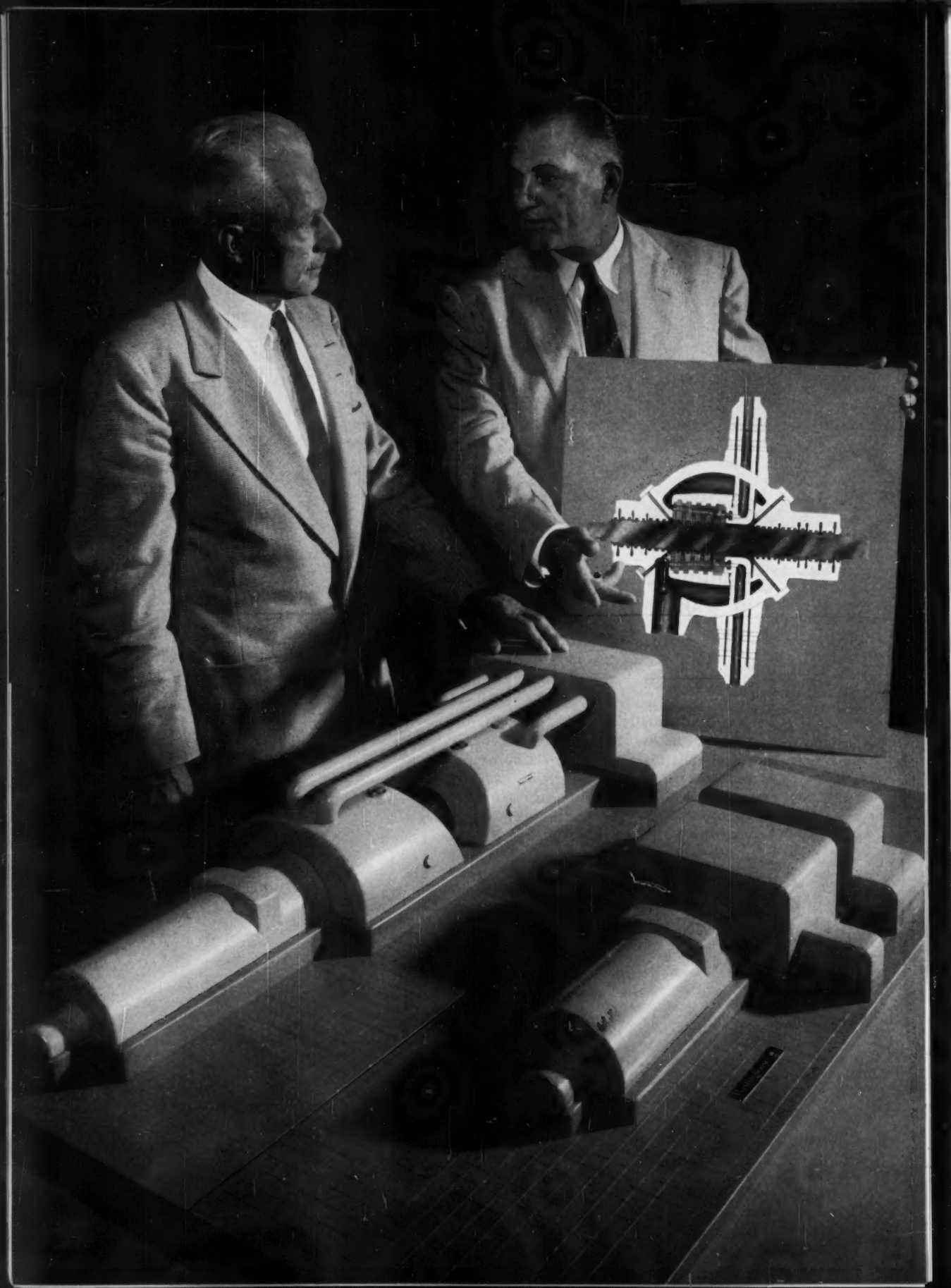
This new Westinghouse power capacitor for high-voltage outdoor applications has the same mounting dimensions as the 25-kvar unit. Only height has been increased. This means more kvar capacity on limited pole space, twice the capacitor rating in the same rack. Here, certainly, are worth-while savings in installation or replacement cost per kvar—in time, space and labor. In stacking, too, over-all rack space can be cut 50%.

Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-60886

YOU CAN BE SURE...IF IT'S

Westinghouse



Helping the industry meet its growing loads

New 5000-psi turbine-generator will produce world's most efficient kilowatts

In the battle to reduce costs per kilowatt hour, Westinghouse has just scored another victory for electric utilities with a new world-record turbine. This giant unit now on order by Philadelphia Electric Company will operate at a pressure, temperature and efficiency that will surpass all other machines now operating or on order.

Substantial performance gains are expected from the Philadelphia Electric Company turbine. A plant heat rate approaching 8000 Btu's per kwhr will be obtained. This is an efficiency improvement of over 10% above present stations.

Every day Westinghouse research and development works to advance the frontiers of steam progress even further. There is no end to the effort of progressive Philadelphia Electric Company—and the entire electric Utility Industry to meet the mushrooming demand for power—a demand that has doubled every decade. This constant advancement will keep electrical energy today's best buy . . . tomorrow's, too.

J-97196-X

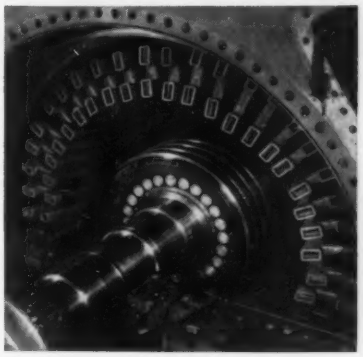
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

Super critical unit

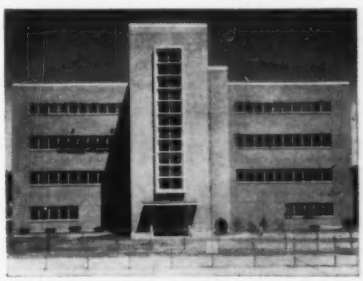
The new 5000-psi, 1200° F. turbine for Philadelphia Electric Company is a cross-compound, four-cylinder unit. It will use double-flow exhaust to the condenser and double reheat to 1050° F.

The two Westinghouse generators will have a combined rating of 416,000 kva, three phase, 60 cycle, 20,000 volts. They will be self-ventilated with shaft-mounted fans, and will employ hydrogen inner-cooling of rotor and stator conductors.



Inner-cooling

Generator inner-cooling represents a tremendous advance in dissipating heat from current-carrying windings. By actually circulating hydrogen *inside* both rotor and stator conductors, Westinghouse engineers have doubled single shaft ratings over conventionally cooled units with greatly reduced size and weight. Already proved in extensive service, inner cooling has become the *key* to even greater generator ratings at a saving in cost. Without the use of inner-cooled conductors, it would be impractical to build the large capacity generators required by the utility industry today. Well over 10,000,000 kva of inner-cooled generators are presently on order at Westinghouse.



Turbine laboratory

Advanced development on steam and gas turbines is being conducted at the new Westinghouse laboratory near Philadelphia. Here, amid facilities that are the most modern in the world, engineers and technicians work to advance the prime-mover art. Out of this laboratory will come the great turbine developments of the future that will help the utility industry produce kilowatts at lowest possible cost and keep Westinghouse in the vanguard of steam turbine progress.

Waddell, Brown Appointed to Maine PS Posts

JOHN D. WADDELL

Maine Public Service Co has appointed John D. Waddell as vice president of engineering and operation and Ralph A. Brown as treasurer.

Waddell, who comes to the utility from a post at Stone & Webster Service Corp, succeeds M. S. Blackwell, who has resigned. The new vice president was previously associated with Duquesne Light Co, Delaware Power & Light Co, and Iowa Southern Utilities Co and had experience in the railroad and industrial fields.

Brown succeeds C. Hazen Stetson, who has resigned to give full time to his duties as executive vice president. Brown has been with Stone & Webster for the past 6 years in various technical advisory capacities relating to public utilities throughout the U.S.

RALPH A. BROWN

E. J. Good Is Elected Sales VP

Newly elected vice president in charge of sales for Louisville Gas & Electric Co is Edward J. Good. He replaces J. Russell Ramage, who retired from the post after 45 years with the company and one of its predecessors, the Louisville Lighting Co.

Good, who began his utility career 29 years ago, has served in various utility sales capacities, and has had experience in the residential, commercial, and industrial phases of electric and gas sales. His previous positions include manager of electric sales and general sales manager of the company.

EDWARD J. GOOD

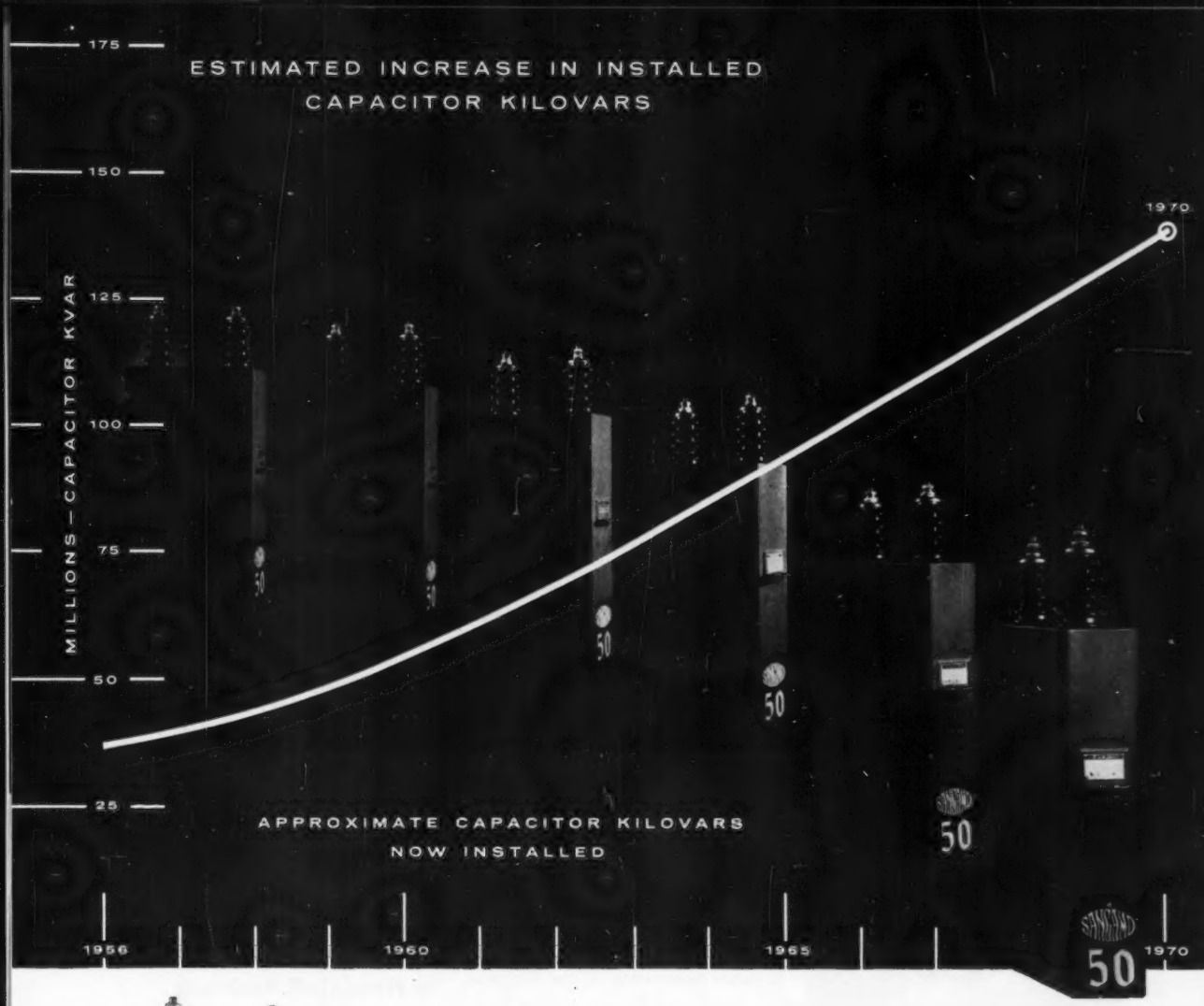
Iddles Named AIF President

New president of Atomic Industrial Forum, Inc, for the forthcoming year is Alfred Iddles, president of Babcock & Wilcox Co since 1948. He succeeds Detroit Edison Co Pres Walker L. Cisler, who retires from the Forum presidency after serving in that capacity since 1953.

Iddles, who has been with Babcock & Wilcox since 1937, is a charter member of the Forum and has served as a vice president and member of the executive committee and board of directors since its 1953 inception.

The Forum, organized to develop and utilize atomic energy for peaceful purposes, is composed of 1,600 individuals and 510 manufacturing firms, research institutions, electric utilities, universities, and labor organizations.

ALFRED IDDLES



PC56-5

Plan low-cost kvar supply with Sangamo Capacitors

The tremendous growth facing the electric utility industry, and associated economic considerations, point up the need for near unity power factor operation at peak load. Your growing requirements for Kvar supply can be met adequately and economically with Sangamo Power Capacitors.

These capacitors are designed to the specifications of power engineers throughout the country. They are built in a brand new "controlled conditions" plant—under exacting Sangamo quality control through every step of the manufacturing process. They are thoroughly tested to help make sure that their service life is long and troublefree.

Sangamo Diaclor Power Capacitors are available in 25 or 50 Kvar ratings—of identical width and thickness—as individual units or in factory-assembled and wired Auto Var equipments for quick, economical pole top installation. All units are clearly marked to show Kvar rating. Get the full Sangamo Power Capacitor story. Ask your Sangamo Representative or write us today.

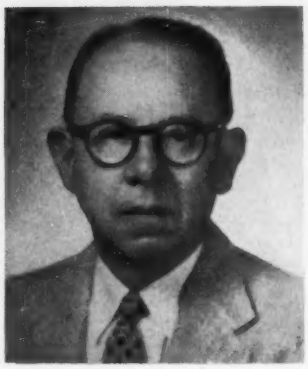
SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

Memco Appoints Executive VP

Edwin A. Williams, general manager of Federal Pacific Electric Co's Switchgear Division at Scranton, Pa., for the past two years, has joined Memco Engineering & Manufacturing Co, Inc, as executive vice president.

An electrical engineering graduate of Virginia Polytechnic Institute, Williams joined General Electric Co in 1929, and after a training period, was placed in charge of engineering at the firm's Switchgear Department in Philadelphia. He served there in various management positions until 1948, when he was transferred to the company's X-ray component in Milwaukee. Three years later he joined R&IE Co as chief engineer, and remained in that post until 1954, when he joined Federal Pacific Electric.



EDWIN A. WILLIAMS

PERSONAL BRIEFS

Rochester Gas & Electric Co's Electrical Division has advanced **Howard A. Brown** to superintendent, electric distribution department; **Edward J. Nelson** to superintendent, electric load research and planning; and **Henry J. Genthner** to assistant superintendent, electric distribution department.

Howard Cowan, former editor of McAlester News-Capital, has been appointed director of Public Affairs for Public Service Co of Oklahoma to succeed **D. J. Tuepker,** recently named company president.

Harkness to Head CEMA

Col Robert Dickson Harkness was elected president of Canadian Electrical Manufacturers Association at the group's recent annual meeting.

Harkness has been president of Northern Electric Co, Ltd, since 1948 and is active in numerous Canadian industrial and financial fields.

Clyde Dailey has been named assistant secretary of Kansas Power & Light Co. In other company promotions, **Dale Whitaker** transfers to Hutchinson Division as manager to replace **Wally Wick,** retired; **Bill O'Connell** becomes new advertising manager; and **Earl Sexton** is named Riverside plant superintendent succeeding **Mike Funston,** now Tecumseh supervising engineer.

E. Finley Carter has been elevated from associate director to director of Stanford Research Institute . . . **William J. Stewart,** assistant general manager of Wheeling Electric Co, succeeds Monongahela Power Co Pres **Don B. Potter** as president of Public Utilities Association of the Virginias.

Southwestern Gas & Electric Co's **R. A. Neal,** former mechanical engineer in the power department, has been named supervisor of plant design.

Decentralization of Westinghouse's Lamp Division into five product departments resulted in the following managerial appointments: **Charles E. Erb,** manager of large lamp department; **Charles W. Flood, Jr.,** miniature lamp department; **Joseph Schlig,** photolamp department; **Elwood W. Noxon,** lamp parts department; and **Joseph G. Carroll,** Ken-Rad lamp department. Also appointed were **L. J. Fitzpatrick,** manager of operations; **James E. Woodall,** manager of manufacturing; **Dr. Rolland M. Zabel,** manager of engineering; **John E. Fox,** manager of industrial relations; and **Wallace R. Wirths,** manager of public relations.

General Electric Co has appointed **Charles B. Seelig** to succeed **Ralph E. Donnelly** as manager-marketing for the small steam turbine department. Donnelly transfers to the large steam turbine-generator department . . .

New general manager for General Electric Co's small integral motor department is **John F. Welch** . . . **William Alvarez** has been named manager of engineering at GE's industry control plant in Roanoke, Va., succeeding **H. W. Poole,** who is now associated with GE's Marketing Services Division in New York.

Electrical World Names 10 to New Staff Positions

In preparation for more intensive coverage of industry activities, ten Electrical World staff members have been given new responsibilities and titles. The men and their new titles follow:

Daniel T. Braymer, assistant to the editor; Leonard M. Olmsted, managing technical editor; Herbert R. Frankel, managing news editor; Kenneth K. Kost, manager of production.

John J. Kearney, assistant managing technical editor; Jesse A. Mock, assistant managing news editor; George Swift, assistant manager of production.

James G. Plunkett, Northeastern editor; Allen Long, news editor; Arthur J. Stegeman, assistant manager of market research.

Two editors have been added to the staff: Kenneth N. McLean as industrial editor, and Thomas R. Jordan as editorial assistant.

Now a new standard of safety in low-voltage switchgear

Test position with doors closed

This exclusive I-T-E low voltage switchgear feature establishes a new standard of safety in testing circuit breakers. It offers the additional advantages of reduced handling; less maintenance; convenient "tagging out"; better dust protection; easier circuit identification. And all are yours at no increase in cost in the compact, modern design of I-T-E low-voltage switchgear.

For complete information, contact your nearest I-T-E sales office. Or write for Bulletin 6004B. I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY
Switchgear Division

MEETINGS CALENDAR

OCTOBER

• **American Society of Testing Materials**—B-1 on Wires for Electrical Conductors, Sheraton Park Hotel, Washington, D. C., Oct. 22-23.

Pennsylvania Electric Association—Communications Committee, Fort Stanwix Hotel, Johnstown, Pa., Oct. 22-23; Relay Committee, Hotel Robert Treat, Newark, N. J., Oct. 25-26.

American Institute of Electrical Engineers—Electrification of Machine Tools Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 22-24; Farm Electrification Conference, Hotel Peabody, Memphis., Tenn., Oct. 29-31.

American Standards Association—38th Annual Meeting and 7th National Conference on Standards, Hotel Roosevelt, New York, Oct. 22-24.

University of Texas—Ninth Power Distribution Conference, University Batts Auditorium, Austin, Tex., Oct. 22-24.

National Safety Council—44th National Safety Congress & Exposition, Chicago, Illinois, Oct. 22-26.

National Association of Corrosion Engineers—South Central Region Meeting, M & M Building Houston, Texas, October 23-26.

Oklahoma Utilities Association—Electric Light & Power Division, Western District, Chickasha, Okla., Oct. 25; Eastern District, Poteau, Okla., Oct. 26.

Northwest Public Power Association—Third Annual Workshop of Power Use Section, Franklin PUD Auditorium, Pasco, Wash., Oct. 25-26.

Edison Electric Institute—Wiring Promotion Committee, Cherry Hill Inn, Haddonfield, N. J., Oct. 29-30.

Montana State Rural Electric Cooperative Association—Annual Meeting, Lewiston, Mont., Oct. 29-31.

Electrical Management Society—Hotel Sherman, Chicago, Ill., Oct. 31-Nov. 2.

NOVEMBER

Pennsylvania Electric Association—Transmission and Distribution, Shenango Inn, Sharon, Pa., Nov. 1-2.

• **Edison Electric Institute**—Electric Space Heating & Air Conditioning, Indianapolis, Indiana, Nov. 1-2; Sales Personnel & Training Committee, New York, N. Y., Nov. 2; Commercial Lighting Committee, Shoreham Hotel, Wash., D. C., Nov. 8-9; Industrial Relations Committee, EEI Headquarters, New York, N. Y., Nov. 15; Industrial Power & Heating Group, Detroit, Mich., Nov. 15-16; Accident Prevention Committee, Statler Hotel, Hartford, Conn., Nov. 26-28.

National Rural Electric Association—Region Nine Annual Meeting, Davenport Hotel, Spokane, Wash., Nov. 12-13.

National Electrical Manufacturers Association—Annual Meeting, Traymore Hotel, Atlantic City, New Jersey, Nov. 12-16.

Pacific Coast Electrical Association, Inc—Administrative Services Section, Hotel Biltmore, Santa Barbara, Calif., Nov. 14-15.

American Society of Refrigerating Engineers—43rd Semi-annual Meeting, Hotel Statler, Boston, Mass., Nov. 25-28.

Inland Empire Waterways—23rd Annual Convention, Chinook Hotel, Yakima, Washington, Nov. 26-27.

American Society of Mechanical Engineers—22nd National Exposition of Power and Mechanical Engineering, Coliseum, New York, N. Y., Nov. 26-30.

Third International Automation Exposition—New York Trade Show Bldg., N. Y., Nov. 26-30.

Great Lakes Conference of Railroad and Utilities Commissioners—First Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va., Nov. 29-30.

DECEMBER

Institute of Radio Engineers—2nd Instrumentation Conference, Biltmore Hotel, Atlanta, Ga., Dec. 5-7.

Edison Electric Institute—1957 Conference Planning Committee, sponsored jointly with American Gas Association, EEI-AGA Headquarters, New York, Dec. 6-7; Street Lighting Committee, Dayton, Ohio, Dec. 6-7; Commercial Cooking & Water Heating Committee, Cleveland, Ohio, Dec. 13-14.

JANUARY, 1957

• **Northeastern Weed Control Conference**—Sheraton-McAlpin Hotel, New York City, Jan. 10-12.

American Institute of Electrical Engineers—Winter General Meeting, Hotel Statler, New York, Jan. 21-25.

Doble Engineering Co—24th Annual Conference of Doble Clients, Sheraton Plaza-Hotel, Boston, Mass., Jan. 14-18.

Missouri Valley Electric Association—Industrial & Commercial Sales Conference, Hotel President, Kansas City, Mo., Jan. 31-Feb. 1.

FEBRUARY

National Association of Purchasing Agents—26th Annual Mid-Winter Conference, Public Utility Buyers' Group, Brown Hotel, Louisville, Ky., February 3-5.

Electric Institute of Washington—Electrical Trade Conference & Exposition, Shoreham Hotel, Wash., D. C., Feb. 12-14.

• **Pacific Coast Electrical Association**—Business Development Section, Sheraton-Palace Hotel, San Francisco, Calif., Feb. 28-Mar. 1.

American Society of Heating and Air-Conditioning Engineers—63rd Annual Meeting, Chicago, Ill., Feb. 25-28.

• Additions this week.

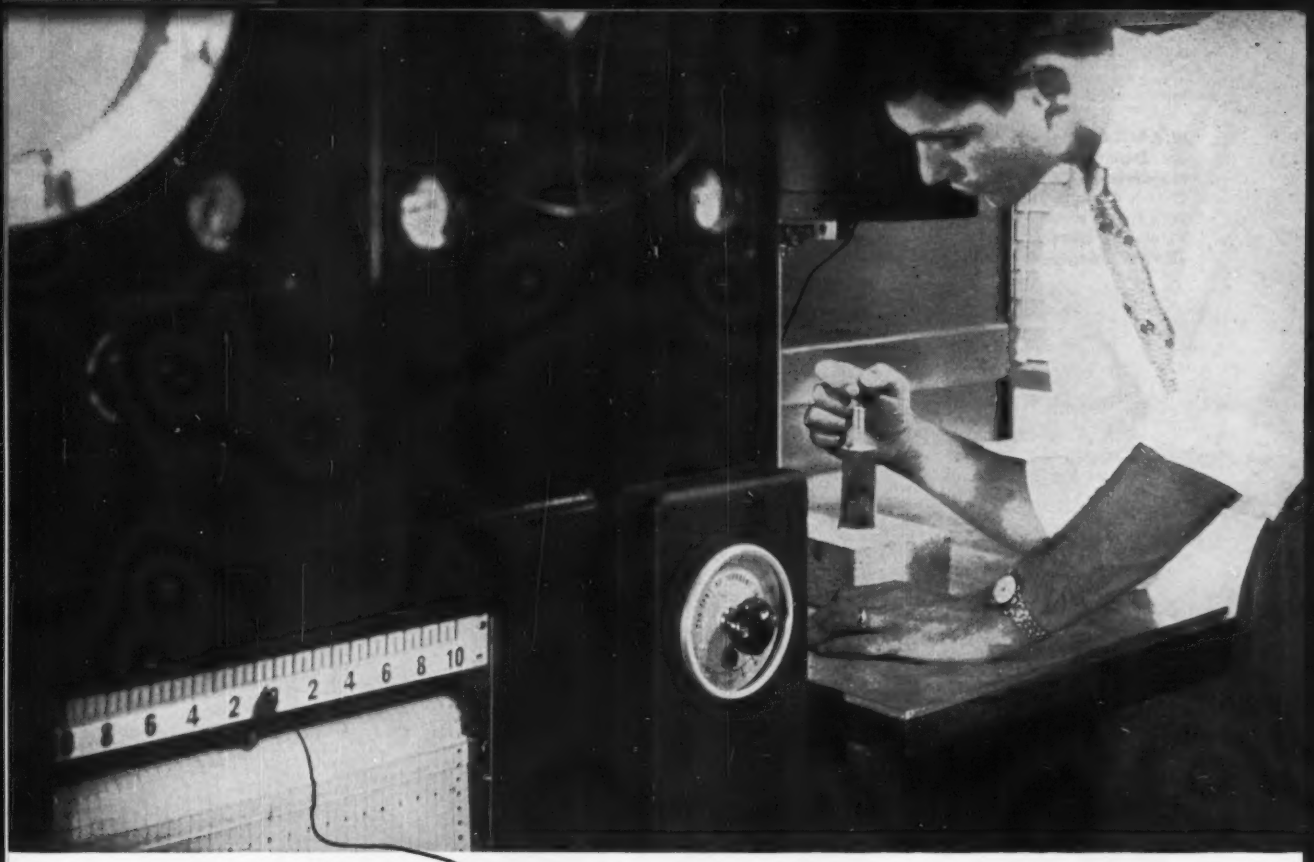
Court Ok's Idaho Power Dams

A U. S. Circuit Court of Appeals has upheld Federal Power Commission's controversial decision to permit Idaho Power Co to construct three low dams in the Hells Canyon region of the Snake River.

The court decision temporarily blocked opponents who, seeking federal construction of a single high dam, had submitted a petition requesting suspension of the FPC-issued construction permit.

National Hells Canyon Assn had argued that FPC violated the Federal Power Act by not recommending federal construction and by not making an independent survey of the project. But the court ruled that FPC had conducted hearings lasting over a year, and that the ultimate decision to grant the license was based upon more than 50 "greatly detailed findings of fact."

Opponents are now considering either a request for reargument before a full panel of the circuit court or carrying the fight to the U. S. Supreme Court.



Keeping track of

$5Al_2O_3.2MgO.24SiO_2.6H_2O.Na_2O.CaO$

...in Insulator Raw Materials

The complex formula above stands for "Montmorillonite", one of a group of highly plastic minerals present in the clay which is a component of every insulator. As these little known minerals contribute properties to the clay which are most important when it is formed into insulators for your power system, it is necessary to determine their presence and quantity in raw materials coming to us from the mines.

In the past, it has been difficult to make fast, positive identification of these fine clay fractions . . . even by such means as the petrographic microscope and X-ray diffraction.

Today, however, General Electric is pioneering the application of Differential Thermal Analysis (DTA) in this small but important phase of Locke* insulator manufacture. DTA is a reliable system for determining minerals in ceramic materials by interpreting differences in heat absorption and emission during firing between a test sample and a known inert material. These are recorded by the graph you can see in the photo. With DTA, another scientific method is added to mass production of fine electrical porcelain.

DTA is another illustration of the extremes to which we go to make sure you get Locke insulators of uniform density, high mechanical strength, dimensional accuracy and long service life. Insulator Department, General Electric Company, Baltimore, Maryland.

*Registered Trademark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

W. J. RUDGE, *Mgr*—Lightning Arrester and Cut-out Engineering, points to newly designed Magne-valve gap—the reason for General Electric's smaller, lighter distribution arrester. Both types, directly connected (standing) and externally gapped (on table) use exclusive Thyrite® Magne-valve operating principle.

HI-SPEED, EFFICIENT ARC INTERRUPTION

Movie frames show how rapid rotation of arc and extinction of follow current in less than one-half cycle prevent localized heating—help the new Magne-valve arrester protect against subsequent surges.

Here's why General Electric's

NEW MAGNE-VALVE DISTRIBUTION ARRESTERS

pack more protection in less space

General Electric's new Thyrite Magne-valve distribution arresters are the smallest and lightest valve arresters on the market today. Some ratings are as much as **40% lighter** than competitive models. These features make the arresters easier to stock, handle and install—help to eliminate clearance problems.

Operating principle. In order to obtain smaller size and lighter weight, General Electric engineers have applied exclusive Magne-valve action to these arresters. A space-saving, concentric ring gap unit was designed to pack more protection in less space. Like the service-proven Magne-valve station- and line-type arrester gap units, the new distribution arrester gap helps maintain consistent spark-over voltage and assures efficient power-current arc interruption.

High discharge capacity. These arresters also have capacity for high discharge currents exceeding that of any other distribution arrester. They easily withstand the 65,000-amp AIEE standard discharge current test. Also, long duration discharge and duty-cycle tests have demonstrated their superior performance under all conditions. Both types provide positive line-lock-out prevention.

Two types. General Electric offers you a choice of two types, directly connected with ground-lead disconnect or externally gapped. Every arrester in both series offers complete system protection and many advantages over expulsion arresters—including better impulse protection, longer service life and universal application anywhere on the system regardless of short-circuit capacity. Ratings from 9- thru 18-kv are available in both types. Dependable G-E pellet arresters are still available for voltage ratings of 3- thru 15-kv.

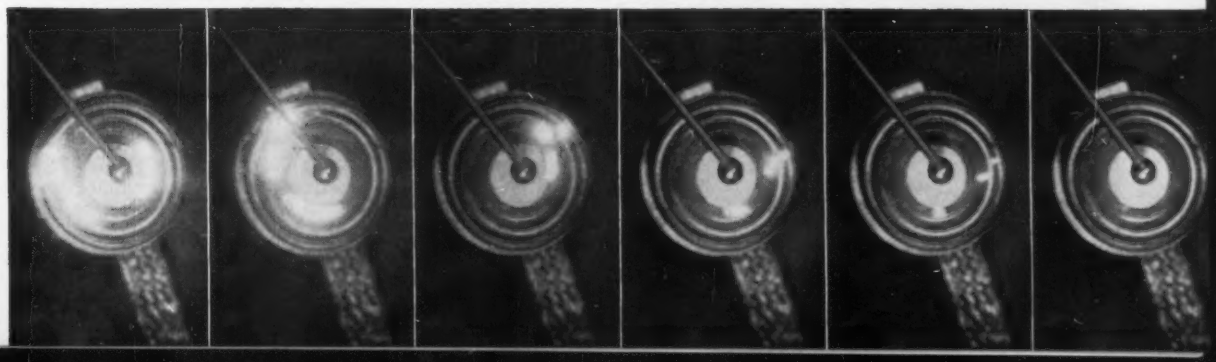
For complete information on this new line of G-E distribution arresters, call your nearest G-E Apparatus Sales Representative or write for bulletin GEA-6379, General Electric Company, Schenectady 5, New York. 432-18

LIVE BETTER ELECTRICALLY

**Registered Trade-mark of General Electric Company for molded resistance material.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

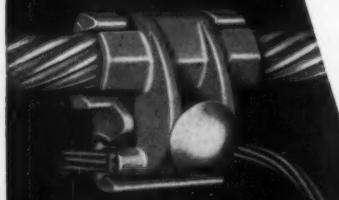


Connect
COPPER with COPPER
ALUMINUM with ALUMINUM
use...

PAC-5
ACSR 6—1/0 Cu. 8—1/0

PAC-3
ACSR 8—2 Cu. 8—2

PAC-4
(formerly PAC 6—0)
ACSR 6—1 0 Cu. 6—2



PAC-7 (replaces PARC 6—0)
ACSR 1 0—336.4
6—1 0 A R Cu. 8—1 0

BLACKBURN COPPER TO ALUMINUM FITTINGS

BLACKBURN PAC CLAMPS

ELIMINATE CORROSIVE SOLDERS, VOIDS AND FLUXES !

There are many satisfactory copper connectors for connecting copper conductors.

There are many satisfactory aluminum connectors for connecting aluminum conductors.

Blackburn's PAC clamps combine the features of a good copper connector and a good aluminum connector to give you the best copper to aluminum connector available.

Our exclusive method (Patent applied for) of pressure casting molten corrosion resistant aluminum alloy around specially treated pronged copper liners establishes an intimate, low resistance contact of the two metals without using corrosive solder.

The copper liners, which cannot be mated incorrectly, surround the copper conductor establishing a good copper to copper contact.

The aluminum grooves surround the aluminum conductors, establishing a good aluminum contact.

Adequate contact surface and conductor separation is built into Blackburn's PAC clamps to insure long-lasting, trouble-free copper to aluminum connections without setting up cold flow or galvanic corrosion.

Spring action is inherent in the design of PAC clamps and is supplemented with an extra-heavy spring lockwasher insuring permanently tight connections which will withstand temperature fluctuations.

Hot dipped galvanized steel hardware is standard. Aluminum hardware available on all but Catalog #PAC-3.

AVAILABLE THROUGH ELECTRICAL WHOLESALERS EVERYWHERE

JASPER BLACKBURN CORPORATION

35 MADISON STREET • ST. LOUIS 6, MO. • PHONE: MAin 1-2821

F. A. SALMON, (left) Central Power & Light, vice chairman, EEI Committee, and G. J. Yanda, Cleveland Electric Illuminating, chairman EEI Committee, listen as R. B. Swallow, Public Service Electric & Gas, chairman, AEIC Committee, speaks

EEI, AEIC Told Meter Trends

Lafayette meeting hears manufacturers on all-purpose, single-phase, 200-amp wattmeter and new demand recorder

A trend toward an all-purpose, single-phase watthour meter of 200-amp capability was reported by manufacturers to the Edison Electric Institute and Association of Edison Illuminating Companies' meter and service committees in joint meeting Sept. 24-26, at Lafayette, Ind. Nominal rating of some makes is 30 amp; others are 50 amp. According to the manufacturers, these meters would sell at the same price as the 15-amp-nominal-rated 100-amp capability meter.

Manufacturers, answering questions about the watts required for starting the larger meters, pointed out that present use of electrical equipment minimizes the importance of this characteristic.

Demand Recorder Cited

Fischer & Porter Co described a new demand recorder of the punch-tape type. Data can be readily taken from the tape by business machines. Interest of other manufacturers in developing and improving demand meters indicated that manufacturers are getting into the load survey meter picture for business-machine processing.

A number of companies, it was indicated, have such systems. Sizes of companies using business machines for meter records ranges from 29,000 meters to 2.5-million meters. Meter men pointed out problems involved, and K. S. Field, Ebasco Services, Inc, expressed the opinion that mechanization was coming and that meter men should begin shaping their ideas of how to handle their own requirements.

Although some utility commissions require periodic tests on current transformers used for metering, a real test is costly. It was pointed out that when a current transformer develops a fault, it goes bad quickly and shows up clearly.

Cleans in 2 Minutes

C. V. Morey, Consolidated Edison Co, reported on studies for developing a standard 3-phase meter for 3-wire network, 4-wire network or 3-phase, 4-wire delta service. Some specifications have been suggested, and the project will be pursued. Simplified stocking will be possible when a suitable standard can be developed.

A committee vote indicated interest in incorporating a shunting device with certain meter sockets when the cost can be minimized.

R. M. Grogan reported Long Island Lighting Co's brief but satisfactory experience with ultrasonic cleaning of watthour meter registers. The register need not be disassembled, and the time for a thorough cleaning is only 2 min.

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING JULY

State	Utility	Plant	Fuel	Capacity
Ark.	Jonesboro Water & Light Plant	Jonesboro	IC	1,000
Ga.	Savannah Electric & Power Co	Riverside	S	30,000
Idaho	Soda Springs Municipal Electric Light & Power Dept.	Soda Springs	H	360
Ill.	Bushnell Municipal Electric Light & Power Utility	Bushnell	IC	1,000
Iowa	La Porte City Utilities	La Porte	IC	840
Kan.	Greensburg Municipal Electric Light & Power Dept.	Greensburg	IC	1,163
Kan.	Wheatland Electric Cooperative, Inc	Tribune	IC	250

RETIREMENTS

Fla.	Florida Power Corp	Monticello	IC	1,100
	Florida Power Corp	Perry	IC	800
Kan.	Greensburg Municipal Electric Light & Power Dept.	Greensburg	IC	270
S. D.	City of Fort Pierre	Fort Pierre	IC	296
Vt.	Central Vermont Public Service Corp	Lower Windsor	H	147

U. S.	Hydro	Steam	IC	Total
Added	360	30,000	4,253	34,613
Retired	147	.....	2,466	2,613
Adjustments Plus	....	.....	4,537	4,537
Adjustments Minus	300	.....	.....	300
Net Change	−87	+30,000	+6,324	+36,237

H—Hydro, IC—Internal Combustion, S—Steam

United States Capacity as of August 1—Hydro, 25,132,744 kw; Steam, 90,026,723 kw; IC, 2,378,445 kw; Total, 117,537,912 kw.

SALES
Residential

Direct mail and . . .

Newspaper promotions add impact as . . .

City Ordinance Booms Disposer Sales

200,000 expected in next five years as Detroit requires them in all new homes built. Here's how utility works with city and trade groups

Within the next five years some 200,000 Detroit housewives are expected to do away with their garbage cans. As a result the city will greatly improve its sanitation, and at the same time trim a sizeable chunk off its annual $5½ million garbage collection bill.

This tidy arrangement is the result of two city ordinances passed last January. The first requires that an on-the-site food disposer be installed in all new homes constructed, the second sets up requirements for proper installation and operation of home incinerators. Incinerator manufacturers working with the city are in the process of redesigning and testing home incinerators to meet the new requirements. Meantime, sales emphasis has been placed on the garbage grinder. Units are selling at a rate of 900 a month right now and city officials think this soon will increase to 1,500 to 1,800. The majority of installations are in homes built within the last 5 to 15 years. "Disposers as an appliance are now off the ground in this area", says E. J. Hurley, Detroit Edison's residential and rural sales director.

Directing the project is a city-wide group which calls itself the "Detroit Committee for a Garbage Free City." It was set up early this year when Mayor Albert E. Cobo, realizing the need for encouraging Detroit citizens to install more modern and sanitary methods of waste disposal, pushed through the on-the-site food disposer decree. Members of the committee include representatives from Federal Housing Administration, Chamber of Commerce, Board of Education, property owner groups, local plumbing associations, manufacturers, wholesalers and the electric utility.

Detroit Edison recognizing its civic responsibility is participating in the program. Its prime job, says E. J. Hurley, who is the utility's representative on the project, is to assist the committee in any way possible; such as the preparation of literature when needed for the committee. All material it develops ("Getting Gertie's Garbage" above is sample) carries the committee's signature.

The committee early realized that with a project of this kind the "sharp" operators would likely move in. And they did. But by keeping their eyes open, and by fast counter-attack through publicity, promotion, and Better Business Bureau action, they feel they now have the situation pretty well under control.

"The suede shoe boys gave us some troubles for awhile," admits Carl Walker, committee chairman, "but we've put them down fast."

To do it the committee found the big job was one of education—to

(*Continued on page* 52)

Checking the weight of Pole Star cores requires but a momentary stop on the conveyor line — a pause that pays off in core uniformity and positive assurance of low flux density.
WEIGHTOGRAPH

He's weighing the proper **flux density** into a **POLE STAR** core — Here's why . . . .

Flux density of the core (number of magnetic lines per square centimeter) is worth dollars and cents to the user of distribution transformers. High flux density means high exciting current, which, when multiplied by hundreds or thousands of transformers on the line, can increase distribution costs.

Because flux density is dependent upon the amount of steel used in the core, Pennsylvania Transformer Company has set up an effective system of checks to make certain that every lap-on-top Pole Star core contains the proper amount of steel. Laminations are counted, the core is measured, and then — because there can be minute but important variations in the steel itself — the core is *weighed* to provide a beyond-a-shadow proof that the *right* amount of steel has been used in each Pole Star core.*

That's why, with Pole Stars, you get proper flux density and low exciting current *every time.*

**This extra precaution precludes, for example, any possible variations in the cores as a result of slight "wrinkles" in the steel, or as a result of otherwise unnoticeable discrepancies in the insulating coating of the steel.*

167 Production Controls make Pole Star best!

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** *Greater Pittsburgh District*

Pole Star Transformers are available in all standard single phase distribution sizes from 3 through 500 kva, through 67,000 volts.

• By installing a Central Information System, Gulf States Utilities Co improved plant efficiency and released 13 operating men for duty at a new plant. An analogue computer is the heart of CIS

'Automatic' Steam Plant

Electric companies cannot halt spiraling labor costs, but sometimes they can get around them. Gulf States Utilities Co has done just that at its Neches power station. The company has released 13 operating men from Neches for operating duties at a new plant. And besides reducing labor costs, the company has improved the operating efficiency of the 240-Mw plant.

Gulf States did this by installing a system that eliminates the need for the 28,000 manual readings that had been taken daily. The new system uses an analogue computer to collect only the necessary readings. An automatic logging machine prints this data along with station efficiencies and certain operating trends.

This set-up is known as the Central Information System (CIS). It monitors eight turbines, ten boilers, and all their appurtenances. By coordinating and collecting all data at one point, it allows safer, quicker, more accurate, and more economical station operation. The company believes that this is the first time such a system has been used to keep tab on power station efficiency.

Gulf States feels that this installation is one of the largest single steps taken in the industry's approach to the automatic generating station of the future. CIS makes it possible for older plants, such as Neches, to compete on a manpower basis with steam power plants now under construction.

CIS neither replaces nor involves any existing equipment. It supplements the present instrumentation and brings practically all necessary information to one point. There an attendant observes at a glance what is taking place throughout the entire plant—not only during normal operations but, more important, when trouble occurs.

The information center can alert roving operators, via telephone or loudspeaker, to any abnormal difficulty in the plant. Trouble can be found in a minimum of time and can be averted before it becomes acute.

The CIS at Neches Station performs these functions:

- Scanning of the most important temperatures, such as those of bearings, steam, water, and oil.
- Transmitting an alarm of abnormal pressures, temperatures, levels, and flows.
- Re-transmitting alarms from the existing individual panels throughout the plant to the central control point.
- Recording the operating trend, instantaneous net output, and fuel consumption of each unit and the trend of boiler superheat temperature and feed water flow. Any function which is not normally trend recorded—such as pressure, temperature, and level—can be recorded by means of plug-in jacks to several idle trend recorders.
- Automatic logging of the important functions of plant operation, including hourly and daily computations of each unit's heat rate. CIS also computes and logs the vital factor trends which afford instantaneous checks of efficiencies involving condenser cleanliness, pre-heater plate temperatures, and cooling tower efficiencies.
- Printing the off-normal functions in red on the log sheet and transmitting an alarm signal.

CIS is now in operation at Neches Station. But, as with most initial installations, there are still certain bugs to be ironed out. These are almost entirely in the analogue computer and are primarily of a mechanical nature.

Judging from limited experience with CIS at Neches, Gulf States is enthusiastic about its possibilities. In fact, the company has approved a second installation and is completing the design features of a third.

The second CIS is now being installed in the 75-Mw Riverside Station and should be in operation by June 1957. The company expects this installation to free nine operating men at Riverside for duties in other plants.

Studies are also in progress for a CIS that will release 20 to 25 operating men from the 263.5-Mw Louisiana Station. The plant supplies steam and electricity to several major industries and requires almost constant checking for billing computations. The company hopes to use

• Automatic logging typewriter prints necessary data along with station efficiencies and certain operating trends. CIS eliminates the need for 28,000 manual readings that had been taken daily

Slashes Operating Costs

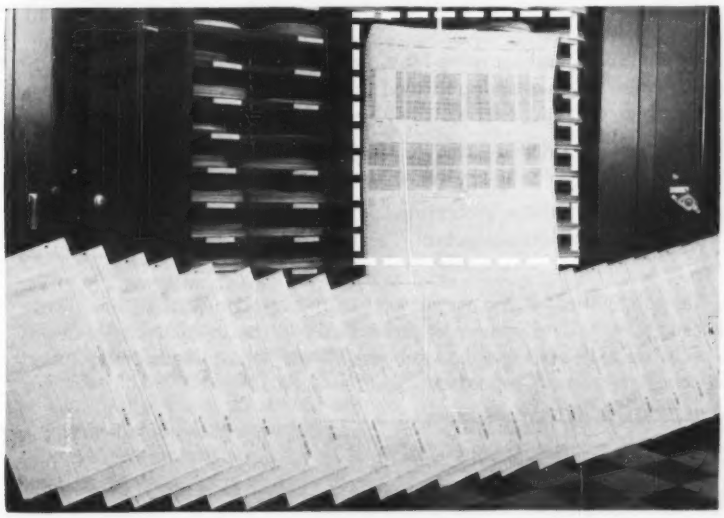
the analogue computer to incorporate automatic computations and billings into the CIS at the Louisiana Station.

The cost of the Central Information Systems at the Neches, Riverside, and Louisiana Stations is estimated at $770,000. Yet the three installations should pay for themselves in about three years. Gulf States expects to realize an annual gross return of $275,000 from increased operating efficiencies and savings in labor costs. The incremental increase in maintenance expenditures is limited to $6,000 for each of the first two years. After that it is expected to level out at $10,000 annually.

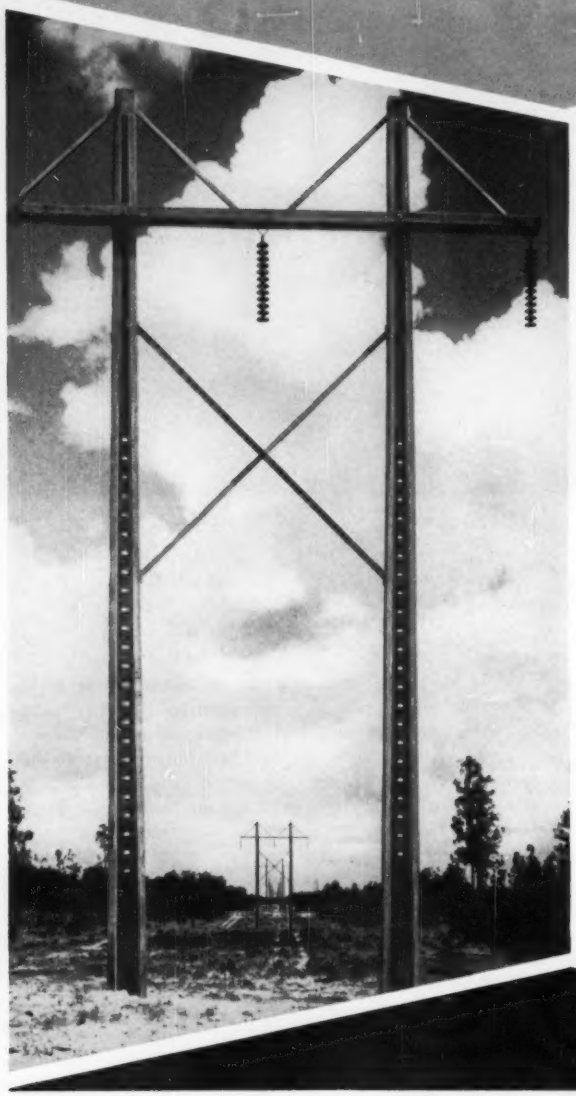
Gulf States is considering a fourth Central Information System, this one for the new Roy W. Nelson Station. It would have some modifications to permit operation of the two-unit plant on a three-man-per-shift basis. The total plant organization would be about 28 men.

There would be no routine manual log readings at the company's Nelson Station. All would be done automatically on two logging typewriters, one for normal plant values and the other for efficiencies and trends.

Gulf States Utilities and the manufacturer spent about two years on the study, design, and construction of the Central Information System. The electric utility's efforts were directed by J. A. Reich, production manager, and W. B. Gurney, superintendent of results. The manufacturer of CIS is Panellit, Inc, of Skokie, Ill.



• Single daily log sheet (dotted box) replaces all logs and charts in photo. CIS monitors 8 turbines and 10 boilers at Neches Station. It helps old plants compete with new ones on a manpower basis



TODAY...

Roebling tensioning materials
have created many markets
for prestressed concrete . . .
warehouses • garages • stadiums
bridges • piers • hangars
and other construction

TODAY...

Another new market for fabricators

Prestressed* Concrete Line Poles

Shown here is one of the latest in the constantly growing list of applications for prestressed concrete. These power line poles were designed and fabricated for the Florida Power Corporation by Finfrock Industries, Inc., Orlando, Florida.

Each pole is prestressed with ⅜" diameter Roebling uncoated 7-wire stress-relieved strands, pretensioned and bonded to the concrete.

Easily transported and installed, the 65 ft (above ground) poles have a life expectancy of 50 to 100 years. Once erected, they are maintenance-free. The high cost of replacement every few years is eliminated.

Why don't you investigate the possibilities of this new market to increase your profits? Roebling engineers, who pioneered in the development of prestressed concrete in America, will supply general information or help with specific problems. Write to Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING
A Subsidiary of The Colorado Fuel and Iron Corporation

*Not *to be confused with ordinary reinforced concrete*

How Appliances Will Sell in Next 10 Years

More than 170 million major units will be produced between now and 1966 says forecast. Here's how each appliance is expected to perform

More than 170 million major appliances will be put on the U.S. marketplace in the next 10 years by the electric industry, forecasts Hotpoint Co in a new study just released.

How this production will be shared among the appliances is shown in the table at right. Figures show number of each appliance in use, saturation, unit shipments, and per cent replacements predicted for this year, 1961, and 10 years from now. A primary factor behind the growth expected will be an expansion of the residential market. Number of wired homes will increase from 47.1 million this year to 52.3 million in 1961 and 57.3 million in 1966, says the forecast.

Room air conditioners, custom ranges, and dishwashers can expect the fastest gains in public acceptance over the 10 years. Saturation of room coolers will jump from 7.8% this year to 30% in 1966, custom ranges from 2% to nearly 14%, and dishwashers from 4.7% to 19.7%. As to be expected of a newcomer, the combination washer-dryer also will make remarkable gains going from less than a half of one percent today to more than 9% in 1966. Refrigerators will continue to be tops in terms of number produced followed by automatic washers and air conditioners.

Washers to be Replacements

By 1960, says the Hotpoint study, the automatic washer market will be primarily a replacement market, the same as the refrigerator and free standing range markets are today. Dryers, however, won't become predominently replacement until sometime after 1966. And while the combination washer-dryer market is slated for big things, the industry by 1966 will be selling nine times more washers and four times more dryers.

Not shown in the table are television receivers. Industry sales in 1956 are forecast at 7.2 million units of which 175,000 are color sets. Sales in 1961 will rise to 9.2 million sets, of which 4 million will be color, and by 1966 will reach 11 million units, more than three-fourths of them (8.5 million) color.

Industry Appliance Sales

Year	% Saturation†	Number in Use (Millions)	Industry Unit Shipments (Millions)	Replacements (% of Shipments)
AUTOMATIC WASHERS				
1956.....	32.4	15.28	3.25	32.3
1961.....	45.9	23.98	3.59	64.7
1966.....	49.7	28.46	3.8	84.4
ELECTRIC DRYERS				
1956.....	9.6	4.58	1.2	8.9
1961.....	21.1	11.09	1.88	26.1
1966.....	31.2	17.9	2.4	48.3
COMBINATION WASHER-DRYERS				
1956.....	0.4	0.2	0.133	0
1961.....	3.4	1.77	0.527	11.5
1966.....	9.1	5.22	1.281	25.0
CABINET RANGES				
1956.....	27.4	12.9	1.254	52.0
1961.....	28.6	14.95	1.59	76.8
1966.....	29.2	16.7	1.92	81.8
CUSTOM RANGES				
1956.....	2.0	0.944	0.325	1.3
1961.....	7.2	3.78	0.715	2.7
1966.....	13.9	7.98	1.0	8.0
DISHWASHERS				
1956.....	4.7	2.2	0.413	3.2
1961.....	10.9	5.69	1.04	14.4
1966.....	19.7	11.27	1.75	28.6
FOOD DISPOSERS				
1956.....	6.5	3.1	0.6	9.0
1961.....	12.7	6.64	1.07	21.0
1966.....	21.0	12.03	1.73	28.0
WATER HEATERS				
1956.....	16.8	7.9	0.875	37.1
1961.....	20.2	10.56	1.3	57.8
1966.....	23.8	13.64	1.67	60.8
REFRIGERATORS				
1956.....	95.1	44.79	3.7	54.5
1961.....	96.8	50.6	4.4	76.1
1966.....	97.15	55.6	5.5	80.8
FREEZERS				
1956.....	18.2	8.55	1.0	13.1
1961.....	24.2	12.65	1.04	20.4
1966.....	28.9	16.55	1.25	35.0
ROOM AIR CONDITIONERS				
1956.....	7.8	4.19*	1.6**	0.7
1961.....	18.8	12.3*	2.7**	5.0
1966.....	30.0	25.1*	3.9**	14.0

† Saturation based on 47.1 million wired homes in 1956, 52.3 million in 1961 and 57.3 million in 1966.
* Residential units only.
** Includes both residential and non-residential units.

"Vote to Live Better Electrically"

Philadelphia campaign makes hay of public's current political interest. $5,000 prize contest aims to build prospect lists and store traffic

"Vote to Live Better Electrically," the Electric Association of Philadelphia's current compaign could start something new in appliance promotions.

First, its timing with the national elections helps it to capitalize smartly on an event of high public interest. Second, it attempts to sell any and all electric appliances rather than concentrating on specific items. Third, it attempts to sell wiring by selling the concept of electrical living first.

Feature "plank" is a $5,000 consumer contest. The entrant on an official "ballot," completes this sentence in 50 words or less: "I cast my vote for (name of appliance) to Live Better Electrically because. . . ." First prize is $2,500, second prize $500, third prize $100—plus 76 other prizes of $25 each. Campaign and contest started Oct. 1, closes Nov. 17.

All participating dealers (284 of them have signed up) were given 300 ballots imprinted with their name, store address, and telephone number. In addition each one gets full-color window and store displays, plus advertising support. One 1,800-line ad and three 1,200-line ads will appear in Philadelphia dailies during the campaign—all listing the names and addresses of dealers "polling places." Additional ads are slated for suburban weeklies. All plug the contest and invite the public to call at the dealer's store and get their ballots.

"100-A Housepower" Included

To tie wiring into the LBE picture, the association is using its time-tested "100-A Housepower" program as the second featured plank of the campaign's "platform."

"But campaign promises are cheap," says the association. "The outcome of any election lies with the local campaign managers and precinct committeemen." To stimulate trade action, the platform includes the following inducements: To the distributor salesmen (the campaign managers) a bonus of $4 will be given for every dealer signed up. The top salesman will get $50. Another $1,000 in cash will be shared by dealers (the committeemen) whose names appear on the ballots of the winning contestants. These dealers will receive 20% of the prize amount won by their customers. And every dealer who has 10 or more official ballots entered from his store will be refunded his $15 campaign contribution.

For a minimum $25 the association also offers dealers an "Electrical Living Party" package—a professionally staged store sales demonstration complete with displays, printed invitations.

Although it's too early yet to tell the campaign's outcome, John Morrison, the association's managing director, says things so far "look good. Our advertising is beginning to click, the ballots are coming in, and all 284 dealers who signed up have put in campaign windows," he said.

Disposer Ordinance

(*Continued from page* 46)

inform the public and take the mystery out of disposers.

"We sent out a letter on the committee letterhead to areas where the fast-buck boys were operating," explains Walker. "To back us up the legitimate suppliers and plumbers ran news ads and the papers carried stories on benefits and how to buy disposers" (cut on page 46).

"We've pretty well built acceptance for food disposers," continues Walker, "now we're moving into the demand stage." We don't look at this strictly as a Detroit city project. We have hopes it will affect the metropolitan area and also have impact on older homes. The committee says that after saturation reaches 60% of new homes, it may try to extend the ordinance to apply to all dwelling units.

Some brands of disposers are being sold for $89.95 to $99.95 complete with installation. "Prices of disposers here are among the lowest in the nation," he declares. Prime reasons: Increased volume and experienced installation know-how by plumbers.

The food disposer enactment is not new with Detroit, of course. But it is the largest city yet to undertake such a project. A number of surrounding communities also have similar ordinances. One, Grosse Pointe Woods, allows the home owner to pay for his disposer in installments on his water bill. He also can choose to use an incinerator instead.

To other communities which may be considering food disposer legislation, Walker offers a few tips gained from his own committee's experience: 1. Get ready—go to the trade and develop your method of sales and cost; 2. Go to the city and present your plan; 3. Announce it to the public.

"It's a city-sponsored idea, but free enterprise has had to make the sale," concludes Walker. "And it's not merely a program to help alleviate a financial burden on the city. We feel sincerely that the garbage can is not the proper way to dispose of garbage. Food disposers and incinerators are the modern sanitary way".

Sales Briefs:

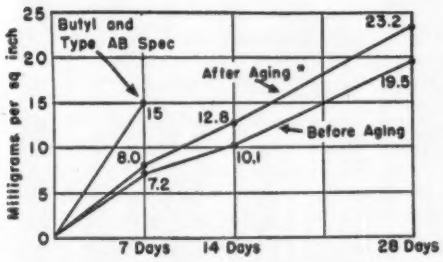
Carolina Power & Light Co's "White Glove Clean" range and water heater campaign achieved 155% of quota, rang up $3.5 million worth of sales in three-months . . . More claims for electricity's speed as a cooking fuel (EW, Jan. 23, p 116): This time Tappan Stove Co is billing the chrome-lined oven in its new 36-in. electric range model as "world's fastest."

Amazing moisture resistance of Anaconda's Type AB butyl high-voltage insulation helps reduce failure due to moisture.

When you can't keep cable out of moisture

New insulation keeps moisture out of cable

Exceptional moisture resistance is provided by Anaconda Type AB butyl insulation.



RESULTS OF mechanical moisture absorption test show Type AB retains good moisture resistance even after aging.

Where rubber-type cable is installed in underground ducts or buried directly in the earth, the moisture-resistance properties of the *insulation* are vitally important.

Latest facts show *Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture* than industry standards permit. For the mechanical moisture absorption test, the industry has regarded 15 milligrams increase in weight per square inch of exposed surface, after 7 days' immersion at 70C, as a criterion for satisfactory moisture resistance. Type AB easily meets that requirement — in fact, typical results show it absorbs less than 7.2 mg. in 7 days.

New Engineering Bulletin EB-27 gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

56296

Get all the facts on Anaconda butyl. Write today —

ASK THE MAN FROM ANACONDA®

—PIONEER IN BUTYL INSULATION

TOO LATE
FOR ANYTHING
BUT THE FACTS
the real story of
Station Insulator value
is probably right in
your own file . . . NOW
In your own operating records you probably have the best guide to the selection of station type insulators. Nothing we can say will change these records, and they are especially valuable since they relate to your own set of conditions and are written on your own terms. Some people overlook this source of information when writing specifications for new construction.
Because of the large number of O-B units manufactured over nearly half a century, there is every likelihood of such facts being right in your file. Divide cost by years of service.
People often ask us, "Have you *proof* that O-B station insulation is a good investment?" The answer is, "Yes, but probably not as good proof as *you* have!"
4652-H
Ohio Brass
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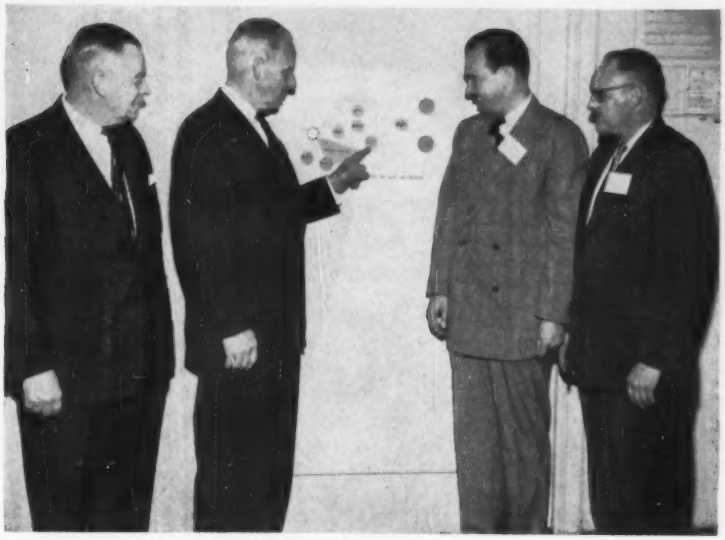


CEMA Plans Adequate Wiring Program

CEMA executives have announced a long range adequate wiring program at the annual meeting of the Canadian Electrical Manufacturers Association at Niagara Falls, Ont., on Oct. 4, 1956.

Objective of the program, which will be launched in 1957, is to enable Canadians to "live better—electrically" at home and at work. Details are being coordinated with the assistance of all branches of the electrical industry, with financial support from CEMA's 150 member companies.

Studying an industry organization chart are (l to r) B. N. Simpson, general manager of CEMA; H. M. Turner, past-president of CEMA; J. W. Kerr, chairman of CEMA's Adequate Wiring Committee; and R. E. Bailey, chairman of the Canadian Adequate Wiring Bureau.

RWMA Reports Orders, Shipments Remain High

Reports of new business and shipments of resistance welding equipment have shown continued increase during 1956, according to the Resistance Welder Manufacturers' Association, Philadelphia, Pa.

Two new shipment records were attained in August. The month represented a new peak for a single 30-day period with nearly $6.5 million in machines shipped. In addition, shipments amounting to $33 million for the first eight months of 1956 represent more than all the dollar volume recorded in 1955, the Association reports.

Orders amounted to more than $5 million, according to member reports for August. A total of $37 million in new equipment orders has been written during January through August this year.

Industry backlog is about $18 million for the remainder of the current calendar year.

Lindberg to Build Ford Aluminum Furnaces

Lindberg Industrial Corp of Chicago has been awarded a contract by Ford Motor Co for 14 large field-erected aluminum furnaces. These reverberatory type furnaces are to handle the annual contemplated requirement of 64 million pounds of aluminum at the new 200,000 sq ft Ford mold and die-casting plant at Sheffield, Ala.

Majority of the furnaces will each have a holding capacity of 65,000 lb of molten aluminum to be received in mobile carriers from the nearby Reynolds primary aluminum plant, thus avoiding the extra industrial process of melting aluminum pigs.

Westinghouse Gets Order for Indian Steel Mill

Orders totaling almost $4 million covering electrical equipment for Tata Iron & Steel Co mills at Jamshedpur, India, have been placed with Westinghouse Electric Corp by Kaiser Engineering Division of Henry J. Kaiser Co.

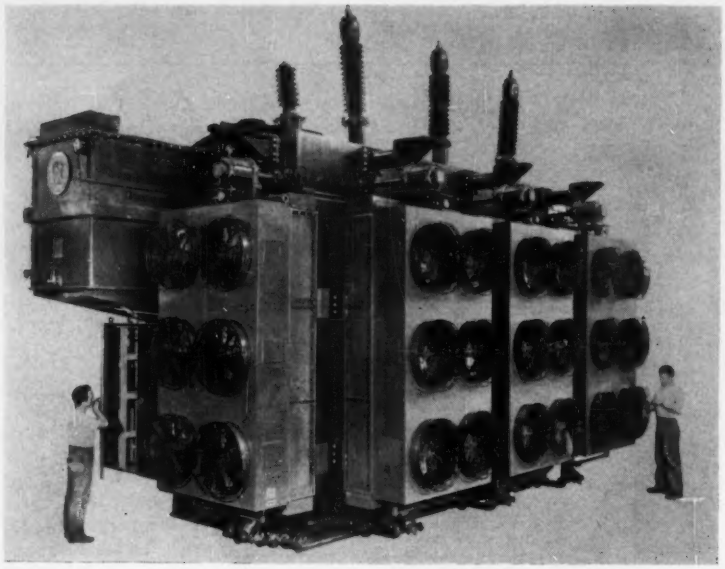
Westinghouse equipment will completely electrify a medium and light steel mill and provide auxiliary direct current for two other mills, it was reported. Kaiser has been awarded a contract to design, construct and equip a $130 million expansion of present manufacturing facilities located at Jamshedpur.

McGraw Plans Merger with Edison Co.

McGraw-Edison Co is the name of a new company formed by the consolidation of McGraw Electric Co and Thomas A. Edison, Inc, it was announced recently. The consolidation is subject to approval of the stockholders of both firms.

Max McGraw will continue as president and chief executive officer of the consolidated company. Charles Edison, board chairman of the Edison firm and Henry G. Riter III, its president, will become directors of the consolidated company. Mr. Edison will become chairman of the merger company. Mr. Riter will be president and chief executive officer of the Edison company, which will continue to operate under its present management as a division of the McGraw-Edison Co.

(*More M&M on page* 56)



Penn Transformer Builds Its Largest Unit

Pennsylvania Transformer Co has shipped the largest transformer it has ever built to the Ohio Power Co. Rated at 260,000 kva, the air-to-oil cooled unit will be installed at Ohio Power's Muskingum River plant. Destined to serve as a main step-up generating station transformer, the 3-phase unit has a high voltage of 141,000 Y volts, and two 15,000-volt low voltages rated at 130,000 kva each. Six low voltage bushings are rated at 6,000 amp. A special compartment contains two independent step-down transformers (one a spare) to supply power to the six air coolers and the oil-circulating pumps.

It was shipped via rail in one piece but with bushings, cooling equipment and accessories removed. This shipping method was reportedly developed by Pennsylvania Transformer in 1952.

MANUFACTURERS EXPANSIONS

• To consolidate operations now going on in five locations, American Machine & Foundry Co is planning a Central Engineering Laboratories at Stamford, Conn. This research and development headquarters would be on a 38.5-acre site and, as presently contemplated, the cost will approximate $4 million.

• Expansion program by Square D Co will enlarge by about 10% the original plans for their plant on a 29-acre site at Lexington, Ky. The 13,000 sq ft increase to the 150,000 sq ft planned plant will bring the total cost to a reported $4.5 million. In Atlanta, Ga. a new regional assembly plant of about 30,000 sq ft is being constructed. In Glendale, Wis., steel superstructure has been completed and exterior walls are going up. In Lexington a small assembly facility has moved into operation and in Denver a similar unit is being built.

• Research on electric motors and allied equipment is to be conducted in a $1.5 million laboratory, according to General Electric Co's Medium Motor Department. The planned facility will be located in an existing building.

• A proposed 60% expansion of General Cable Co's Tampa, Fla., plant is to be made earlier than expected. The 50,000 sq ft plant opened about four months ago and the expansion was planned for a year after the plant opened. The addition will include wire drawing of copper and aluminum for production of power cables.

• Westinghouse Electric Corp has broken ground for a new plant near Bloomington, Ind., for the manufacture of switchgear distribution apparatus. The plant is reported to house approximately 277,000 sq ft of production and office space and employ some 450 persons when full production is reached. Completion is expected by late 1957.

• Neoprene and polyethlyene covered and insulated electrical conductors will be produced in a new addition to Reynolds Metal Co's aluminum wire and cable mill at Sheffield, Ala. The new building will bring to a total floor space of the over-all cable operation to 174,000 sq ft.

• Doubling of present research and test facilities and the building of two new manufacturing plants are plans announced by Trane Co of La Crosse, Wis. One plant is scheduled to produce brazed aluminum special heat transfer units, and the other plant to manufacture low horsepower air conditioning compressors.

• According to one of its spokesmen, Union Carbide and Carbon Co has plans for a new plant for the manufacture of fabricated carbon products. The company has taken an option on some land near Lawrenceburg, Tenn. The plant is expected to employ approximately 100 people initially; it will be operated by National Carbon Co, a division of the parent firm.

• Purchase of the Hathaway plant in Boston was announced recently by the Minneapolis-Honeywell Regulator Co. The 3-story, 250,000-sq ft plant will reportedly house Honeywell's Transistor Division—engineering, production and sales—that is scheduled for transfer from its present location in Minneapolis.

DuMont Ships Electronicam

DuMont Laboratories, Inc, Clifton, N. J., has sent its first mobile Electronicam unit to Hollywood, Calif. The Electronicam is a combination of 3 motion picture cameras, electronic viewfinders, and a closed-circuit TV system with two functional trailers. Total power requirements for air conditioning, director's control trailer is 42 amps per phase on a 3-phase, 115-v system.

(*More M&M on page 59*)

"SNAP IN-SNAP OUT" INSERT DIES ARE EXCLUSIVE FEATURE OF NEW KEARNEY 0-51 and 0-52 TOOLS FOR COMPRESSION FITTINGS

Now, with new Kearney 0-51 and 0-52 lever-action Tools, install the *widest range* of compression sleeves and fittings—faster, more conveniently. And Kearney's original, *exclusive* "SNAP IN-SNAP OUT" interchangeable insert dies give you greatly increased efficiency of operation!

Easiest Dies to Change

Die-changing is swift and simple. No tools needed. No screws to tighten. Self-aligning die halves "snap in-snap out" with two-finger ease. There is utmost rigidity in operation because each die part locks in its rectangular seat by a shoulder and a groove, and is held in place by spring locking pins.

FOR BETTER CONSTRUCTION...SAFER MAINTENANCE

Specify **KEARNEY PRODUCTS**

Write today for Bulletin 13.

Widest Range of Compression Connections

Extra size range is an exclusive feature of the Kearney 0-51 and 0-52 Tools. You can use them for making line connections with Squeezons, L-Taps and T-Taps, also for installing Serv-Ens and Splicing Sleeves on distribution conductor sizes most frequently used.

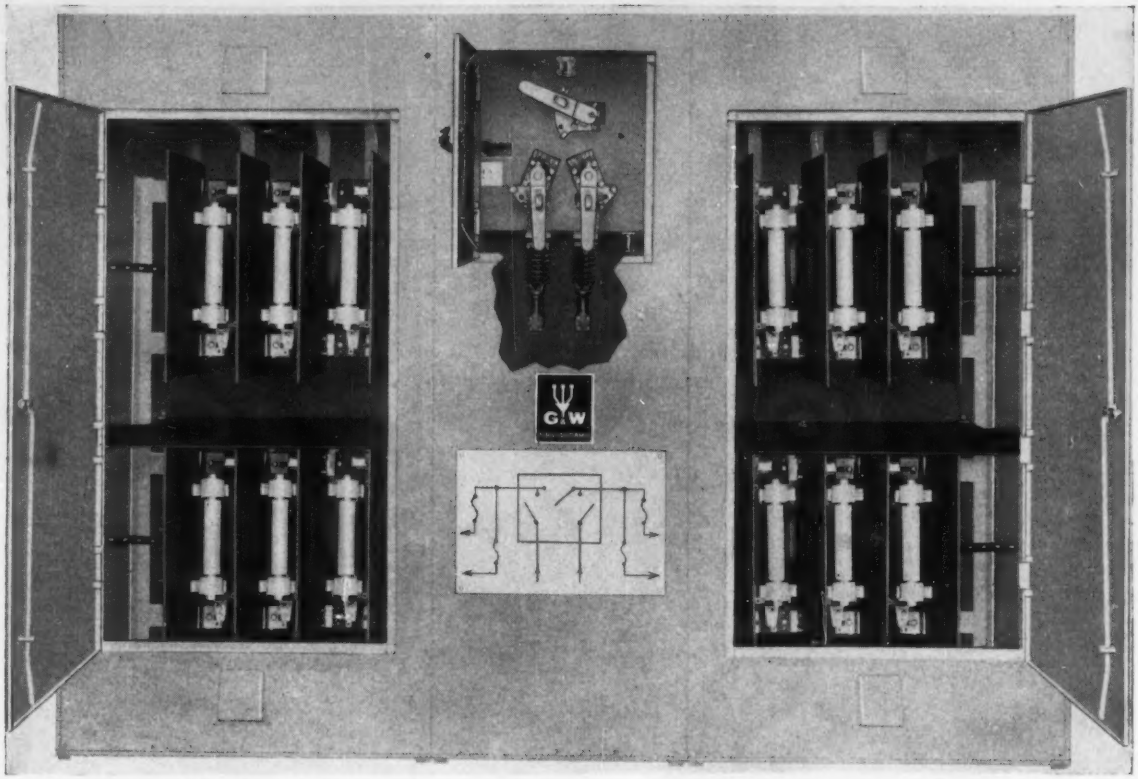
Conveniently positioned in the jaw nose is the fixed die for installing Serv-Ens and L-Taps. The insert dies seat close to the fulcrum pins so minimum effort is needed on tool handles. Insert dies are available to install sleeves and Squeezon fittings for most wire sizes used on distribution systems. Wire cutter dies, also available, snap into same seat as the dies. These new tools are lightweight and rugged, safe for use on energized circuits at distribution voltages. The cost is so low you'll want one on every line truck.

JAMES R. KEARNEY CORPORATION

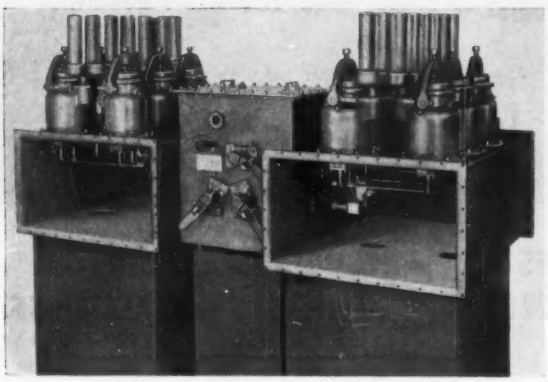
4224-42 Clayton Avenue, St. Louis 10, Missouri

Canadian Plant: Guelph, Ontario

-338



Flexibility for 2 Feeds & 4 Loads



Lower photograph—Type "FCRA" unit, 3 pole, 5000 volts, 400 ampere, 4-way oil switch with 4 sets of "FC42" oil fuse cutouts, 5 Kv. 200 amp., gang operated.

— safely and economically provided by G & W load break oil switches combined with power fuses or with oil fuse cutouts.

The schematic diagram above applies to either combination unit illustrated. The Type "RA" load break oil switch has three sets of manually operated links. Normally, the upper set of links are open and two loads are supplied from each feeder separately. By opening either set of lower links and closing the upper links, all four loads can be supplied by either feeder.

Upper photograph—Type "SCRA" unit, 3 pole, 5000 volts, 400 ampere, 4-way oil switch with 4 sets of high interrupting capacity power fuses. Similar units are available in 15 Kv. and higher voltage ratings.

G&W R

Get in touch with us or our nearest representative for information on combinationFuse-Switch units for your high voltage distribution centers.

G & W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois
Representatives in principal cities of U. S. A.
Also made in Canada by Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

AD NO. CD562

Load Survey Data Recorder Developed

A digital demand recorder which produces automatically a punched tape record of watthour demands has been developed by Fischer & Porter Co, Hatboro, Pa. The punched tape record can be read visually or processed quickly by the manufacturer's automatic tape translator operating a punch card machine.

This demand recorder, reports a company spokesman, was designed especially for, and in cooperation with the EEI Rate Research Committee. Use of the recorder and translator in load research work will allow utility management to obtain up-to-date information on system load characteristics rapidly and inexpensively, according to the company. Also, use of the recorder in customer demand billing is said to allow completely automatic billing procedures.

In the illustration, the instrument is being examined by G. J. Yanda of Cleveland Electric Illuminating Co, chairman of the EEI Meter and Service Committee, during the recent AEIC-EEI meeting at Lafayette, Ind.

M & M BRIEFS

Prentiss Wire Mills, Holyoke, Mass., has been acquired by the Riverside Metal Division, H. K. Porter Co, Inc. Prentiss products include drawn wire in both high and low carbon range, and non-ferrous wires in phosphor bronze, monel and nickel silver.

Essex Wire Corp of Ft. Wayne, Indiana, has announced the merger of Midland Wire Corp, Tiffin, Ohio, and Midland Wire Division, Essex Wire Corp, Birmingham, Ala., with its Paramite Wire and Cable Division. Midland's products, transmission and distribution cable, will be combined with Paramite line of wire and cable.

Royal Electric Corp, a subsidiary of International Telephone & Telegraph Co, has acquired manufacturing plants, facilities and inventory of the Royal Electric Co, Inc. Wire and cable production, other operations will continue at Pawtucket, R. I.

Crouse-Hinds Co, Syracuse, N. Y., has purchased Surveyor Service Co, Inc, of Silver Springs, Md., which will be operated as a wholly owned subsidiary. Latter's products of automatic weather observation systems, tide gages and seismographs will be a supplement to Crouse-Hinds line of aviation lighting and airport control tower equipment and weather measuring devices.

United Power Control Corp is the new name for Pacific Oerlikon Co of Tacoma, Wash., according to Hans Schindler, president. The change in name is reported to identify the company more closely with the industry served and the products manufactured. The name Pacific Oerlikon Co will be used for a new company as a sales and service organization to handle the products of the parent, Oerlikon Engineering Co of Switzerland.

International Nickel Co has arranged for industrial grants totaling approximately $1 million in its program for aid to higher education in the U. S. Some $400,000 will be for the 1956-57 academic year, with about 85 universities and schools sharing the grants. Remaining $600,000 will be applied to extending its fellowships and scholarships during the following four years.

Enjay Co, Inc, Linden, N. J., a marketer of petrochemicals recently unveiled its new Polymer Laboratory, which reportedly doubles the size of the company's sales technical service facilities. Said to be equipped with new and advanced facilities in the field of rubber technology, the laboratory will do most of its work in applications-research on Butyl, the synthetic rubber manufactured from refinery gases, and adapting Butyl to industry's needs.

Copperweld Steel Co is to be presented with a bronze "Oscar of the Industry", being judged as having the best annual report of the small steel companies—Oct. 29 in New York.

Correction, Please

Brown Boveri Corp of New York reported that it will furnish seven airblast breakers with an interrupting rating of 10,000 Mva to Public Service Electric & Gas Co. The rating was inadvertently given as 100,000 Mva in ELECTRICAL WORLD, Oct. 1, p 140.

BUSINESS OUTLOOK

Electrical World
OCTOBER 22, 1956

It's not surprising to learn that the consumer feels prosperous this year, and expects to stay that way next year. He's been carrying home record amounts of income. And unemployment, though troublesome in a few industrial areas, is at the lowest point since November 1953. Furthermore, he has been reading almost consistently glowing press reports about a booming economy.

It is somewhat surprising to learn, therefore, that he is a bit less eager to spend his income on big durables now than he was last May or a year ago. But that is the verdict reached in a new survey by the Survey Research Center of the University of Michigan. This survey, supported by the Federal Reserve Board and the automobile industry, sampled consumer opinion in August and early September.

The survey results have mixed implications for electric utilities. Plans to buy houses are off sharply from last spring. And plans to buy ranges and washing machines are down also. On the other hand, the survey shows an increased interest in buying refrigerators and TV. Plans to buy autos—and this may be a key element in the near-term business outlook—have turned up slightly from last spring. Of course, there is nothing binding about the results. The survey reflects the consumer's attitude at a particular time, and he can change his mind.

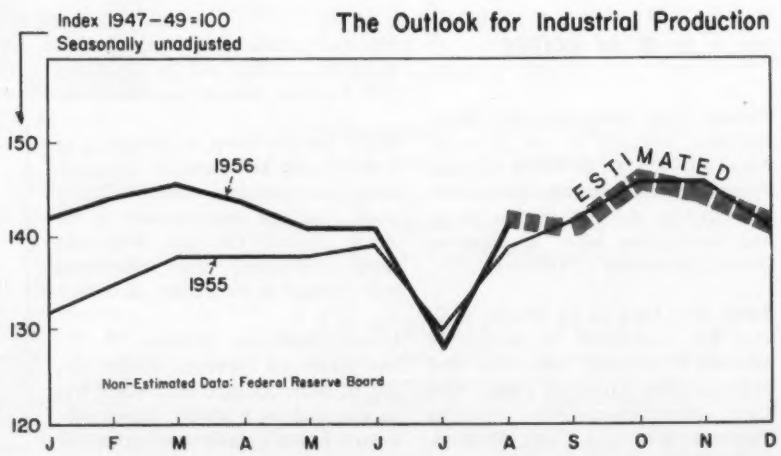
• • •

Industry is continuing to build up inventories. The August figures showed a $200 million increase over July on a seasonally adjusted basis. At the beginning of September industry was holding $6.5 billion more in inventories than it had a year earlier. About half the buildup has been in durable goods.

As yet there is no cause for alarm. A large part of the year's increase in the book value of inventories reflects increases in the prices of raw materials and finished goods, not a build-up of physical stocks. Furthermore the machinery industry, which accounts for a big part of the build-up, has most of its inventory of goods-in-process already spoken for by customers.

Short term money rates are continuing to edge up. And there is talk that the Fed may raise its discount rate again, but no real indications. An easier money market seems a long way off. A tight money market will probably act as a drag on any unnecessary build-up of inventories in the months ahead.

The Outlook for Industrial Production



Paul Bunyan-size reels save setups and splicing . . .

reduce shipping and stringing costs

No midgets are these reels. Largest ever used for aluminum transmission conductors in the United States, they are 96 in. diameter, 60 in. wide. Each reel contains 7,400 ft of 1.75 in. Alcoa® Expanded ACSR, weighs over 9 tons. Other "big" items on this order: cable diameter, 1.75 in., and line voltage, 330 kv—both new highs for the U. S.

Paul Bunyan-size reels mean long lengths without splicing or extra setups. Handling costs are reduced. Big reels will save you money on your next large-diameter conductor order.

This customer service is another "first" in Alcoa's tally of assists in economical solutions of conductor problems. Alcoa engineers are at your service.

Aluminum Company of America, 2306-K Alcoa Building, Pittsburgh 19, Pa.

THE ALCOA HOUR—Television's Finest Live Drama
Alternate Sunday Evenings

This shipment set records:
cable voltage—330 kv,
cable diameter—1.75 in.,
reel size—8 ft diameter, 5 ft wide,
ALL NEW TOPS FOR THE U. S.

Take Hazards Out of Street Lighting

Accident prevention is apt to be a pretty dull subject—until somebody gets killed. Then it becomes a dramatic and vital subject. It might happen in any company, but here is what actually did happen in a western utility's area.

In preparing to re-energize a line following resetting of a pole, a lineman climbed to a point where telephone guy cables were located below the street light bracket. As he touched the bracket for support, he fell to the ground and was dead within a few minutes.

Tests showed the street light circuit was in contact with the frame of the bracket with a potential of about 1,000 volts between the bracket and telephone cable or the common neutral ground. Further investigation disclosed one lead in the luminaire head was grounded because of insulation failure. The pole, being old and dry, had served as an insulating medium in dry weather.

Inspections Began Immediately

Two immediate street light inspections were initiated throughout the system by the company's electric standards committee. A visual inspection noted insulation, clearances, and any unusual conditions. Procedure used in a ground test inspection was to ground the series street light circuit at some convenient point, energize the circuit and proceed from light to light, grounding each mast arm in turn. Suitable hot sticks and ground equipment were used, and a definite indication was obtained in those cases where the mast arm was hot.

A total of 5,511 inspections were made, with 570 defects found in clearances, wire insulation, porcelain insulation, deterioration of bushing insulation, antiquated fixtures, questionable use of equipment and miscellaneous others. Thirty-two hot mast arms were found and corrected, thus eliminating 32 possible death traps.

Twenty-one of the hot arms were caused by insulation failures. These were influenced by the use of various equipment devices which are no longer being installed. Fifteen of these were attributed to wire entrances with heads not containing external bushings, creating a sharp bend in the wire, with bushings so small as to restrict insulation. These features encouraged use of low voltage wire.

Other causes of the hot mast arms included improper insulation, heat damage to insulation, poor workmanship, open leads in contact with bracket or mast arm, and defective heads.

570 Defects Found in Older Fixtures

The 570 defects were found on lights in service for several years and installed prior to the company's adoption of electrical construction standards. All defects, no matter how small, were corrected and present construction standards prevent recurrence of the faults.

The electrical standards committee made several recommendations to strengthen street light maintenance procedure. Specifically it urged use of high temperature tape on leads inside luminaires. It also recommended that street light inspection be standard procedure for all personnel in contact with the equipment and that a review be made of qualifications of those responsible for street light maintenance. Training will be given where deficiencies are detected.

There is much to be learned from this utility's accident prevention procedures. But more importantly, a way must be found to dramatize their need before another life is lost in an "unnecessary accident."

TECHNICAL NOTES

Nearly 20% of electrical work injuries reported in California in 1954 were attributed to unsafe or defective equipment. Far more, over 33%, came from use of tools or equipment in an unsafe place, position, or manner. But nearly 17% involved no worker error.

Helium's zero neutron-capture cross section and good heat transfer characteristics make it desirable as the working medium and coolant for gas turbine nuclear power plants.

Radiation injury is apparently circumvented in exposed mice by subsequent injection of soy bean derivative called "trypsin inhibitor."

Sulfur dioxide is most damaging stack discharge because in the presence of moisture and air it changes to highly corrosive sulfurous and sulfuric acids.

Total fallout from all atomic and hydrogen bomb tests to date will produce less exposure than do natural and cosmic radiation in a normal lifetime.

California PUC Sets Uniform Welding Rate

- **Order requires utilities to make load surveys to make sure that rates are not discriminatory and capacity is available**
- **Requirements for power factor correction and for separate services of more than 2 kw are abolished**

Uniform rules for rating and billing of electric welders and equipment are contained in a recent decision of the California Public Utilities Commission (Decision 53675). These rules will be applied to all customers based on surveys of welding load, as required under the order. The decision follows the commission's finding that existing rates, rules, and regulations governing the use of electricity for welders are unjust and unreasonable. The order calls for revised tariff schedules so as to remove all requirements for power factor correction and for separate service of welders of more than 2 kw.

The new rules establish charges that will be uniform in a particular utility service area and will not be dependent upon existing capacity of the serving utility at the location nor upon a judgment assignment of capacity. "Although a certain amount of additional load checking will be required," says the commission, "adequate checks should be made of connected load to insure that charges are being applied in a nondiscriminatory manner, to enable the utility to determine that any changes or additions to connected load since the last check have been accounted for, and that the load is within the capacity of the utility's facilities to handle, and that the proper rate schedules are being applied."

On this point, one utility witness took objection, stating, "If such load checks were made on a bi-annual basis, it would cost the company an additional $300,000 each year and that only about $150,000 additional revenue would be obtained." Testimony also sought to establish that "it would be difficult to explain the new rules to customers, that required load checking would be a source of annoyance to customers, and that proposed tariff changes would result in grossly excessive bills to some customers."

Under the order, utilities will be required to survey expeditiously existing welder load and have such surveys completed and notification given to existing customers by Aug. 30 1957, with the new rules to be effective on March 1, 1958. Utilities also are required to report to the Commission before Aug. 30, 1957, as to what disposition they propose to make regarding special contracts with existing customers.

Carolina P&L To Sell Stock not Bonds

Carolina Power & Light Co has shifted from the planned sale of bonds to a common stock offering because of unfavorable interest rates, CP&L Pres Louis V. Sutton told the New York Society of Security Analysts recently.

In presenting the company's financial story to the analysts, Sutton introduced North Carolina Gov Luther Hodges who painted a bright future for the Tar Heel state. Hodges noted that new industries coming into the state provide a diversified economy—far different from the textile and tobacco economy of former years. He told the analysts that an ample supply of labor is at hand and the state anticipates and welcomes rapid industrial growth.

Sutton told the group that his organization had planned to sell bonds to raise additional capital for future expansion, but the rising interest rates had forced it to turn to a common stock issue of 500,000 shares. Financial structure of the company will stand at about 44% debt, 15% preferred, and 41% common equity following the stock sale. He said the company expects to earn a "few pennies more than $1.74 per share," which it posted for the 12 months ended Sept. 30.

Carolina P&L boasts of an average residential use of 4,165 kwhr per year compared to a national average of 2,755 kwhr per year, Sutton said. The average annual residential power bill of his customers is $84 compared to a national average of $73. He also reported that only 13¢ of each revenue dollar goes for salaries and wages in his company.

Carolina P&L revenues for 1955 were six times as large as 20 years previously. Revenues of the company have tripled in the past ten years and doubled in the past six and one-half years, Sutton said.

The company now is serving close to 400,000 customers; 40,000 are commercial and industrial.

FINANCIAL BRIEFS

Kidder, Peabody & Co group won $8 million **California Electric Power Co** first mortgage 4½% bonds (A) due 1986 with a bid of 100.35%; reoffered at 101.65% to yield 4.40% . . . Quebec Hydro-Electric Commission is planning to sell $35 million Series P debentures due 1981 through the First Boston Corp and A. E. Ames & Co.

Public Service Co of Colorado will pay November 16 a 10% common stock dividend to holders of record October 15.

Interstate Power Co, Dubuque, Ia, seeks FPC permission to acquire facilities and other assets of Northeastern Illinois Gas & Electric Co.

New SEC associate general counsel is Daniel J. McCauley, Jr. who has been serving as regional SEC commissioner in the Washington, D. C., area. He succeeds Bruce L. Carson.

Future Financing

$1.1 Billion Placed

Electric and gas companies have now completed three quarters of their intended financing programs. The electric utilities have now placed $1,110,000,000 of the expected $1,480,000,000 securities. Gas utilities have sold $734 million of the expected $960 million.

Schedule Light Ahead

November and December schedule is practically empty. However, a number of issues are planned for December.

Watch For Next Year

It looks like a heavy financing calendar for early 1957. With the normal 1957 financing and the issues postponed from 1956 the amount already scheduled for the first quarter of 1957 totals $250 million.

Bond Sales Slow

Investors thought well of the yields new bonds offered in September. However, now in mid-October an electric bond rated "A" was offered at 4.40% to the public, a high point for an "A" electric bond in this period of rising interest rates, and sales were off to a slow start on the first day of public offering.

Due Diligence Meetings

October 26, Ohio Power Co, and November 8, Public Service Electric & Gas Co.

(Furnished by the Irving Trust Co from the Financing Calendar)

DATE	COMPANY	Amount of Offering (Millions) DEBT	EQUITY
OCT. 23	Consolidated Edison	$40.0-C	.....
23	Central Illinois Public Service	.....	5.7-C
23	Philadelphia, Pa	58.9-C	.....
24	Houston Natural Gas	.....	10.0-N-cv Pfd
24	National Steel	55.0-N	.....
25	Ohio Thoroughfare	25.0-C	.....
30	Ohio Power	28.0-C	6.0-C Pfd
30	Greenwich-Killingly Expressway	75.0-C	.....
30	Pacific Lighting	.....	20.0-N Pfd
31	Texas Power & Light	.....	10.0-N Pfd
31	Allied Stores	15.0-N	.....
OCT. No Date	Alabama Gas	7.0-P	.....
	Garden State Parkway	25.0-C	.....
	Curtis Publishing	24.5- -R	.....
NOV. 1	National Bank of Detroit	.....	14.0-N-rt COM
14	Public Service Electric & Gas	50.0-C	.....
16	Chase Manhattan Bank	.....	50.0-N-rt COM
20	Texas Power & Light	10.0-C	.....
NOV. No Date	Transcontinental Gas Pipe Line	20.0-P	.....
	Sinclair Oil	165.0-N-cv-rt	.....
DEC. 3	U. S. Governments	9,100.0- -R	.....
3	Dallas Power & Light	12.5/14.0-C	.....
4	Michigan Bell Telephone	30.0-C	.....
4	Public Service Electric & Gas	.....	35.0-N COM
DEC. No Date	Massachusetts Port Authority	115.0-C-R	.....
	Appalachian Electric Power	24.0-C	.....
	Delaware Power & Light	.....	6/8.0-C Pfd
	Texas Eastern Transmission	40.0-N	.....
4th Quarter of 1956 (Month not indicated)	Otter Tail Power	5.0-N	.....
	Northern Natural Gas	20.0-N	.....
	Philadelphia Electric	30.0-C	.....
	U. S. Governments	0/2,000.0*	.....
	Central Vermont Public Service	1.0-N	.....
	American Louisiana Pipeline	.....	15.0-C Pfd
	Texas Gas Transmission	28/30.0	.....
No Date	Portland General Electric	16.0-P	.....
	Kansas Nebraska Natural Gas	5.5-P	.....
	U. S. Rubber	50/60.0- -cv-rt	.....
	Arizona Public Service	8.0-P	.....
	North Carolina State School	25.0	.....
	El Paso Natural Gas	30.0-P	.....
	J. P. Stevens	30.0-N	.....
	Southern Nevada Power	7.0-C	.....
	Ohio Thoroughfare Revenue	50.0-C	.....
	Sacramento Utility District	85.0	.....
	Grand River Dam Auth., Okla	27.0	.....
	Hetch Hetchy, California	54.0	.....
	Mississippi Valley Gas	15/20-P	.....
	Florida State Turnpike Auth	185.0-N	.....
	California Toll Bridge Bay	180.0	.....
	New York State Grade Crossing	25/40.0	.....
	Missouri State	75.0	.....
JAN. 8	New England Telephone & Telegraph	35.0-C	.....
15	Louisiana Power & Light	18/20.0-C	.....
JAN. No Date	Long Island Lighting	20/25.0-C	.....
	New England Power	10.0-C	.....
FEB. 5	Public Service of Indiana	30.0-C	.....
FEB. No Date	Southwestern Public Service	5.0-N	5.0-N-rt COM
	Elizabeth River Tunnel, Va	43.0-C	.....

Symbols: C—Competitive; N—Negotiated; P—Private; R—Refunding; cv—Convertible; rt—Rights; Pfd—Preferred; COM—Common. *—Estimated.

"Pressure-creosoted telephone poles mean an actual budget reduction!"

Mr. Travis with one of the 98,362 pressure-creosoted poles now giving such good service on the lines of the United Telephone Company of Iowa.

reports United Telephone Company of Iowa, Newton, Iowa

"Our telephone system is 81.8% pressure-creosoted," reports Mr. Lawrence E. Travis, Vice President and General Manager, "and within 10 years will be 100% creosoted. Because of the excellent characteristics of the pressure-creosoted poles, we have even changed our original estimate of 35 years to a longevity span of 40 for the poles, and we have been able to reduce our budget for 1956.

"The following table shows the value we place on our pressure-creosoted poles: From 1951 to 1955 we spent—

1951	$109,291	for pressure-creosoted poles
1952	99,643	
1953	98,466	
1954	106,962	
1955	105,213	
1956	73,326	

"The main reason for the reduction lies in the longevity of the pressure-creosoted poles. We can afford to taper off due to this life span, and the poles we buy from now on will be primarily for system extension and change-over to heavy class pole."

Heavy wire loads, high winds, ice burden, severe ground strain and stress, freezing winter cold and boiling summer heat have no effect on the pressure-creosoted poles of the United Telephone Company of Iowa. Mr. Travis continues, "We find the pressure-creosoted poles 100% neutral to weather, bugs and water. We used to core test every two years but have discontinued the practice because of the uniformity of performance of the poles. The poles, even those in the ground since 1936, are as good as they were then . . . and the butt ends are in excellent shape."

If you would like more information on pressure-creosoted utility poles, and the way they can enable you to save money and establish better service for your utility, just get in touch with the nearest Chemical Sales office of United States Steel or write to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS CREOSOTE

SALES OFFICES IN PITTSBURGH, NEW YORK, CHICAGO, CLEVELAND, SALT LAKE CITY AND FAIRFIELD, ALA.

UNITED STATES STEEL

STATISTICS

4th Quarter Capital Expenditures Will Top Last Year by 20.8%

Total Business Expenditures for New Plant and Equipment†
Billions of Dollars — seasonally adjusted at annual rates

	1955				1956			
	Jan-Mar	Apr-June	July-Sept	Oct-Dec	Jan-Mar	Apr-June	July-Sept*	Oct-Dec*
Manufacturing	10.17	10.84	11.97	12.48	13.45	14.65	15.82	16.87
Durable	4.78	5.06	5.77	6.00	6.57	7.38	8.17	8.64
Nondurable	5.39	5.78	6.20	6.48	6.88	7.27	7.65	8.23
Mining	.80	.94	.99	1.08	1.13	1.28	1.32	1.28
Railroad	.74	.80	.96	1.17	1.25	1.22	1.32	1.53
Transportation (other than rail)	1.46	1.62	1.60	1.70	1.65	1.63	1.85	1.99
Public utilities	4.01	4.09	4.43	4.48	4.56	4.61	5.20	5.31
Commercial and other**	8.46	8.90	9.70	10.54	10.78	11.10	10.75	11.02
Total	25.65	27.19	29.65	31.45	32.82	34.49	36.26	38.00

† excludes agricultural outlays and spending charged to current account.
* estimates based on anticipated expenditures reported by business in late July and August.
** includes trade, service, finance, communication and construction.

Source: U. S. Dept. of Commerce and Securities and Exchange Commission.

Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	July	117.54	117.50	108.70	8.0
Peak—Class 1 Systems (million kw)	July	94.8	97.0	89.3	6.2
Estimated Dec. '56 Peak	July	106.09	106.06	103.47	2.5
Production—billion kwhr	July	49.45	49.45	46.63	6.0
Hydro		9.91	10.05	9.35	6.0
Fuel		39.54	39.40	37.40	5.7
Sales—billion kwhr	July	44.57	44.53	40.89	9.0
Residential		11.38	10.98	9.92	14.7
Commercial		7.74	7.28	6.91	12.0
Industrial		22.71	23.80	21.49	5.7
Other		2.73	2.48	2.57	6.2
Fuel Consumption	July				
Coal—million tons		12.00	12.34	11.74	2.2
Oil—million barrels		4.32	4.61	4.63	−6.7
Gas—billion cu. ft		136.97	127.04	127.62	7.3
Net Income Class A & B Co's—$ million	July	96.86	102.20	89.40	8.3
Residential Customers—millions	12 mos.	45.10	44.99	43.84	2.9
Revenue per kwhr	ended	2.61¢	2.62¢	2.66¢	−1.9
Avg kwhr per customer	July 31	2,899	2,879	2,662	8.9
Avg annual bill		$75.66	$75.43	$70.81	6.8

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	Aug.	141	128	139	1.4
ENR Construction Cost	Oct.	147.6	147.8	141.3	4.5
BLS Cost-of-living	Aug.	116.8	117.0	114.5	2.0
NEMA Sales					
Insulation materials	July	117	156	117	0
Electric appliances		111	106	98	13.3
Wholesale prices	July				
Motors and generators		133.1	132.3	121.5	9.5
Transformers and regulators		134.5	138.2	127.3	5.7
Switchgear and fuses		152.6	152.3	135.5	12.6
GNP—annual rate—$ billion	2nd Qtr.	408.3	403.4	387.4	5.4

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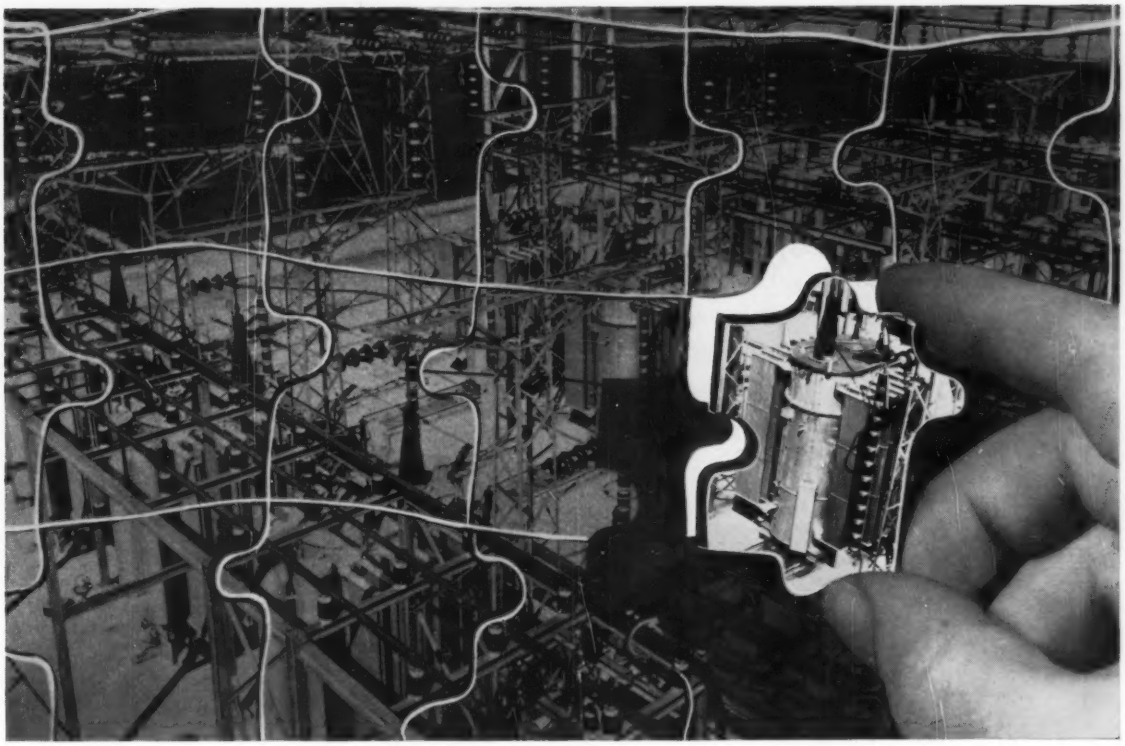

Casually observed, a utility system might appear as a gigantic jig-saw puzzle. To those responsible for system operation however, the pattern is clear and defined.

Each segment . . . each function . . . each piece of apparatus . . . has been carefully planned, assembled and integrated according to a blue print for service.

To that end, all of the varied equipment necessary, must fit perfectly into the utility picture, much as a piece from a jig-saw puzzle.

In the case of Moloney, perfect fit into the utility picture is assured because Moloney Transformers are the result of years of experience in producing quality products. This experience applied within the finest facilities in the industry is available to all utilities to help with today's problems . . . and tomorrow's.

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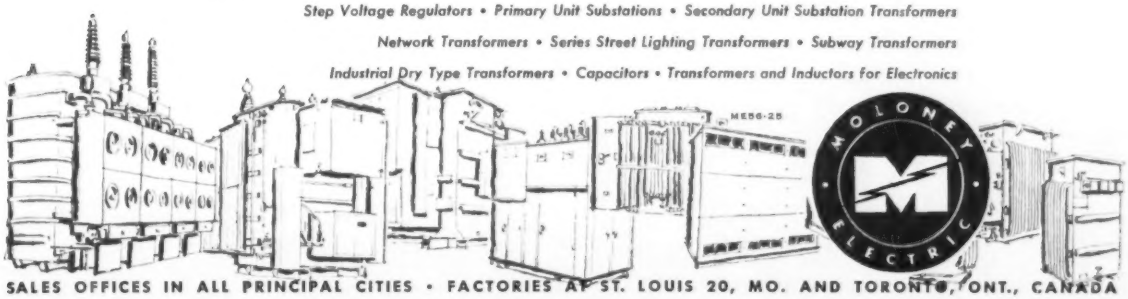

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